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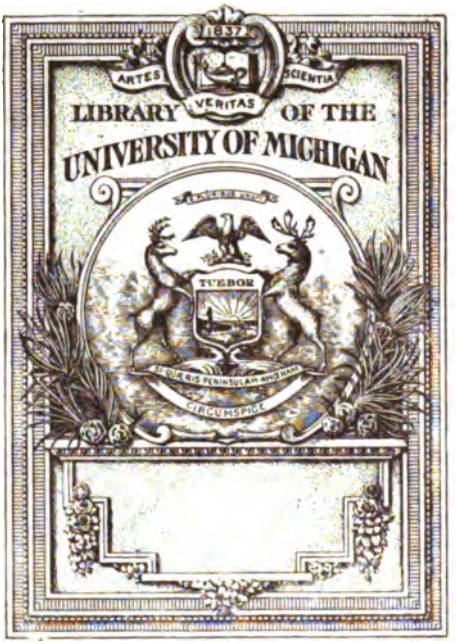
Proceedings

of the

American Association of Medical Milk Commissions

Sixth, Seventh and Eighth Annual Conferences

1912-13-14



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PROCEEDINGS

OF THE

SIXTH, SEVENTH AND EIGHTH ANNUAL CONFERENCES

OF THE



AMERICAN ASSOCIATION OF MEDICAL MILK COMMISSIONS

Sixth Annual Conference Held at

LOUISVILLE, KY., APRIL 30 TO MAY 1, 1912.

Seventh Annual Conference Held at

MINNEAPOLIS, MINN., JUNE 19-20, 1913.

Eighth Annual Conference Held at

ROCHESTER, N. Y., JUNE 19-20, 1914.

CINCINNATI, OHIO
1915



PREFACE.

It has been said truly that milk is the only material in the whole range of animal matter that is designed and prepared by nature expressly as food.

The Medical Milk Commission represents a beneficent system in the field of preventive medicine with the specific object of obtaining clean and safe milk. In its inception its object was definite and concrete, namely: The attainment of milk of a grade designed expressly for clinical purposes.

In the development of its plan and through the federation of all such Medical Milk Commissions, it has included an educational propaganda looking toward the betterment of all milk supplies.

This pure milk movement was started as a professional crusade twenty-five years ago and, by uniting with it sanitarians and health authorities, has activated all agencies striving for pure milk which were previously or have since been organized.

The history of the achievements during this quarter of a century through the growth of an idea and the approach to an ideal, together with the record of the concerted efforts of those identified with the movement during the life of this Association, may be found in the pages of the five previous annual transactions and those covering the three years following published in this volume.

Certified Milk is a professional ideal. It was conceived in the physician's need, it was designed primarily for the physician's use, and it can be realized only through the initiative and intensive labors of the physician, who through his clinical experience determines what its requirements and standards must be, how these relate to its production, and on what scientific lines they may be fulfilled.

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Methods for the production of Certified Milk must depend upon the knowledge of several classes of workers: the veterinarian, the chemist, the bacteriologist, the sanitarian, the pathologist, the research worker, and the dairyman, but the standards in the last analysis must harmonize with and satisfy the needs of the physician.

Clean and safe are terms which from the first have rested as cornerstones in the plan for Certified Milk and are fundamental. They are principles arising in the thought of the idealist and must constantly live in the mind of everyone connected with the production of Certified Milk.

Clean and safe milk never has been nor never will be realized by the mere application to milk production of so-called economic efficiency. There is much in the plan for Certified Milk which has yet to be attained through the acquisition of knowledge. The dominant thought must be the ideal and the mechanical methods of efficiency can only be a means to that end.

Nine principles are involved in this question of clean and safe milk. Three are applied to production, three to collection, and three to supervision.

First: To the dairyman must be offered **Education, — Encouragement, —** and **Endorsement.** Education is fundamental and, as applied to the producer, is most important. The production of clean milk is a discouraging business because the problems of detail are renewed every day and the dairyman must needs have encouragement. He should also receive endorsement or certification by an authorized and responsible board of control.

Second: To the collection and handling of milk there must be applied **Cleanliness, — Caution, —** and **Control.** Cleanliness and caution as respects every working detail and control, not simply through legislation or ordinance, but by a contract control of methods.

Third: The supervision must include the principles of **Hygiene, — Biology, —** and **Prophylaxis.** Hygiene as applied at every step of production, analytical control which includes chemical and bacteriological investigations, and prophylaxis as it relates to bovine affections pathogenic for man and to persons handling and distributing the milk who may become carriers of disease.

The phenomenal growth of the Medical Milk Commission with its plans worked out in minute detail, and with a comprehensive code of methods and standards already adopted, shows that there is only need of an organization with each individual doing a full share of the work to make any such Commission proficient and to render the system invulnerable to attacks from those who would destroy it.

In order to accomplish its purposes, the Medical Milk Commission must show a virile capacity for performing its functions and convert into tangible results not one, but every principle of the system. In this way only will the basis of all its efforts be scientific; will the application of all its efforts be practical, and the result of all its efforts be constructive.

HENRY L. COIT, M. D.

Newark, N. J., May 1, 1915.

TABLE OF CONTENTS.

SIXTH ANNUAL MEETING.

Louisville, Kentucky, April 30-May 1, 1912.

	PAGE
OFFICERS, 1911-1912	6
PROCEEDINGS OF FIRST SESSION	9
REPORT OF SECRETARY	12
REPORT OF TREASURER	13
REPORT OF COUNCIL	13
MILK COMMISSION REPORTS:	
Alameda Co., Cal.	33
Birmingham, Ala.	41
Brooklyn, N. Y.	25
Cleveland, O.	36
Chicago, Ill.	38
Cincinnati, O.	42
Detroit, Mich.	28
Dayton, O.	26
El Paso, Texas	39
Essex Co., N. J.	18
Minneapolis, Minn.	40
New Orleans, La.	32
Rochester, N. Y.	30
St. Louis, Mo.	17
Toronto, Canada	22
Union Co., N. J., No. 2.	30
PROCEEDINGS OF THE SECOND SESSION	48
A NEW VOLUMETRIC METHOD FOR THE DETERMINATION OF FAT IN MILK, By Thos. B. Stillman, Ph.D., Stevens Institute of Technology	48
RESEARCHES INTO THE BACTERIOLOGICAL CONTENTS OF MILK PREPARED AND KEPT IN THERMOS BOTTLES FOR INFANT FEEDING, By R. Hayes Davis, M.D., Louisville, Ky.	51
ANNUAL TUBERCULIN TEST OF CERTIFIED HERDS, By Charles E. North, M.D., New York, N. Y.	59
THE RELATION OF BOVINE TO HUMAN TUBERCULOSIS AND ITS PATHOGENICITY FOR MAN, By Mazÿck P. Ravenel, M.D., Director Wisconsin State Hygienic Laboratory, Madison, Wis.	72

PAGE

SOME BACTERIOLOGICAL PROBLEMS IN CERTIFIED MILK PRODUCTION, By P. G. Heinemann, Ph.D., University of Chicago..... 79
PROCEEDINGS OF THE HOUSE OF DELEGATES..... 87
PROCEEDINGS OF THE THIRD SESSION 89
ADDRESS OF THE PRESIDENT, HENRY ENOS TULEY, M.D., Louisville, Ky. 89
MUNICIPAL MILK PROBLEMS, By John R. Williams, M.D., Rochester, N. Y. 94
METHODS AND STANDARDS FOR THE PRODUCTION AND DISTRIBUTION OF CERTIFIED MILK. 119
PROCEEDINGS OF THE FOURTH SESSION..... 153
BACTERIA COUNT OF MILK GROWN ON MEDIA OF DIFFERENT REACTIONS, By Leon K. Baldauf, M.D., University of Louisville. 154
THE KENTUCKY METHOD OF MILK INSPECTION AND RESULTS, By R. M. Allen, Chief, Kentucky Food and Drug Department, Lexington, Ky. 155
CERTIFIED MILK, PAST, PRESENT, AND FUTURE, By Ernest Kelly, In Charge Market Milk Investigations, United States Bureau of Animal Industry, Washington, D. C..... 163

SEVENTH ANNUAL MEETING.

Minneapolis, Minnesota, June 19-20, 1913.

OFFICERS, 1912-1913 174
PROCEEDINGS OF THE FIRST SESSION..... 175
REPORT OF SECRETARY..... 177
REPORT OF COUNCIL..... 178
REPORT OF TREASURER..... 179
REPORT OF COMMITTEE ON MEDICAL EXAMINATION OF EMPLOYEES.... 182
REPORT OF COMMITTEE ON MILK ECONOMICS..... 184
REPORT OF COMMITTEE ON STATISTICS ON MILK BORNE MORBIDITY AND MILK CHARITIES..... 188
THE FORMATION OF ACIDS IN THE FERMENTATION OF MILK AND THEIR IMPORTANCE IN THE CAUSATION OF NUTRITIONAL DISTURBANCES IN INFANTS, By Clifford G. Grulee, M.D., Chicago, Illinois. 196
THE COMPLEMENT FIXATION REACTION OF THE BLOOD OF CHILDREN AND INFANTS, USING THE BACILLUS ABORTUS AS ANTIGEN, By W. P. Larson, M.D. and J. P. Sedgwick, M.D., Minneapolis, Minnesota. 199
AN EXPERIMENT WITH RAW AND HEATED COW'S MILK AND ITS LESSON, By E. C. Schroeder, United States Experiment Station, Bethesda, Maryland. 210

PAGE

PROCEEDINGS, JOINT SESSION WITH SECTION ON **DISEASES OF CHILDREN, AMERICAN MEDICAL ASSOCIATION,** 246

THE RELATION OF BOVINE AND HUMAN TUBERCULOSIS, By Mazÿck P. Ravenel, M.D., Madison, Wis. 247

CERTIFIED MILK, By T. C. McCleave, M.D., Berkeley, Cal..... 249

THE COST OF CERTIFIED MILK AT FAIRFIELD, NEW JERSEY, By Stephen Francisco, Fairfield, N. J. 259

THE COST OF THE PRODUCTION OF CERTIFIED MILK, By Wallace E. Miller, Lebanon, Ohio. 260

THE EFFICIENCY OF THE MEDICAL MILK COMMISSION GRAPHICALLY ILLUSTRATED, By Henry L. Coit, M.D., Newark, N. J.... 266

THE EFFECT OF BARN OPERATION UPON THE GERM CONTENT OF MILK, By H. A. Harding, Ph.D., Professor of Dairy Bacteriology, University of Illinois. 272

PROCEEDINGS OF THE THIRD SESSION..... 281

THE PUBLIC AND PROFESSIONAL CONFIDENCE IN CERTIFIED MILK AND THE BASIS FOR THIS CONFIDENCE, By Martin J. Synnott, A.M., M.D., Montclair, N. J. 281

THE OPPORTUNITIES OF A MILK COMMISSION FOR PUBLIC SERVICE, By John R. Williams, M.D., Rochester, N. Y. 288

SOME OF THE BY-PRODUCTS OF THE WORK OF THE ASSOCIATION, By A. W. Myers, M.D., Milwaukee, Wis. 296

MILK COMMISSION REPORTS:

Asheville, N. C. 304

Brooklyn, N. Y. 314

Cleveland, Ohio 307

Detroit, Mich. 305

Essex Co., N. J. 310

Hudson Co., N. J. 301

Malden, Mass. 310

Minneapolis, Minn. 303

Pittsburgh, Pa. 306

St. Louis, Mo. 316

Union Co., N. J. No. 3..... 301

PROVISIONS OF STATE LAWS AND REGULATIONS AIMED AT THE PREVENTION AND SPREAD OF COMMUNICABLE DISEASES THROUGH MILK, By John W. Kerr, M.D., United States Public Health Service, Washington, D. C. 317

ELECTION OF OFFICERS..... 324

EIGHTH ANNUAL MEETING.

Rochester, N. Y., June 19-20, 1914.

PAGE

OFFICERS, 1914-1915 326
PROCEEDINGS OF THE FIRST SESSION 327
REPORT OF COUNCIL 329
REPORTS OF STANDING COMMITTEES:
Medical Examination of Employees 334
Chemical Standards 334
Bacteriological Standards 334
Veterinary Inspection and Protection Against Tuberculosis 334
Statistics on Milk Charities 335
Working Methods and Standards 335
Milk Economics 335
REPORTS OF COMMISSIONS:
Alameda Co., Cal. 335
Brooklyn, N. Y. 336
Cleveland, Ohio 342
Chicago, Ill. 341
Cincinnati, Ohio 342
El Paso, Texas 352
Erie, Pa. 365
Essex Co., N. J. 357
Lansing, Mich. 350
Louisville, Ky. 359
Minneapolis, Minn. 360
Philadelphia, Pa. 361
Pittsburgh, Pa. 361
Rochester, N. Y. 351
San Francisco 335
St. Louis, Missouri 362
Wheeling, W. Va. 364
PROCEEDINGS OF THE SECOND SESSION 371
THE NEED OF CO-OPERATION IN SECURING PURE MILK, By John W. Kerr, M.D., United States Public Health Service, Washington, D. C. 372
THE HISTORY OF THE FIRST MILK DEPOT OR GOUTTES DE LAIT WITH CONSULTATION, IN AMERICA, By Henry Koplik, M.D., New York, N. Y. 377
THE RELATION OF PURE MILK TO CHILD WELFARE ACTIVITIES, By Henry L. K. Shaw, M.D., Albany, N. Y. 383
PURE MILK OR CHEMICALLY MODIFIED MILK IN INFANT FEEDING, By Louis C. Ager, M.D., Brooklyn, N. Y. 387

PAGE

The Supervision and Control of Modified Milk by the Milk Commission of Cleveland, By Arnold F. Furrer, M.D., Cleveland, Ohio 391
Proceedings of Executive Session 398
PROCEEDINGS OF THE THIRD SESSION 399
The Relation of Bovine Tuberculosis to Public Health—A Review of the Work of the Past Year, By Mazÿck P. Ravenel, M.D., University of Missouri, Columbia, Missouri 402
The Results of Tests of Herds Under New York County Milk Commission, By William H. Park, M.D., New York, N. Y. 404
An Efficiency Score Card for The Use of The Medical Milk Commission, By Henry L. Coit, M.D., Newark, N. J. 412
Election of Officers 423
PROCEEDINGS OF THE FOURTH SESSION 424
Some Chemical Relations of Milk, By L. L. Van Slyke, Ph.D., New York Experiment Station, Geneva, N. Y. 425
Some Results of Seven Years of Dairy Inspection in Richmond, Virginia, By E. C. Levy, M.D. 435
Municipal Supply and Distribution of Milk, By Hon. Samuel A. Carlson, Mayor, Jamestown, N. Y. 444
PROCEEDINGS OF THE FIFTH SESSION 450
Practical Methods of Milk Examination, By Dr. H. C. Campbell, Philadelphia, Pa. 451
The Relation of the Medical Milk Commissions to Methods and Cost, By J. A. Foord, Ph.D., Amherst, Mass. 455

Constitution and By-Laws 461
List of Medical Milk Commissions in the United States and Canada 466

Sixth Annual Meeting

OF THE

AMERICAN ASSOCIATION OF MEDICAL MILK COMMISSIONS

LOUISVILLE, KENTUCKY

Tuesday, April 30th and Wednesday, May 1st

1912

OFFICERS—1911-12.

HENRY ENOS TULEY, M. D., President.
111 West Kentucky St., Louisville, Ky.

OTTO P. GEIER, M. D., Secretary.
124 Garfield Place, Cincinnati, O.

SAMUEL McC. HAMILL, M. D., Treasurer.
1822 Spruce St., Philadelphia, Pa.

COUNCIL.

ISAAC A. ABT, M. D., Chairman,
32 N. State St., Chicago, Ill.

OTTO P. GEIER, M. D., Secretary.

HENRY L. COIT, M. D.
OGDEN M. EDWARDS, JR., M. D.
JOHN W. KERR, M. D.
J. J. THOMAS, M. D.
HENRY ENOS TULEY, M. D.
SAMUEL McC. HAMILL, M. D.

STANDING COMMITTEES.

Medical Examinations of Employees.

WILLIAM H. PARK, M. D.
THOMAS HARVEY, M. D.
M. J. ROSENAU, M. D.
ALFRED HAND, JR., M. D.

Chemical Standards.

L. L. VAN SLYKE, M. D.
HENRY DWIGHT CHAPIN, M. D.

Bacteriological Standards.

M. J. ROSENAU, M. D.
H. A. HARDING.
ROWLAND G. FREEMAN, M. D.
PROF. W. A. STOCKING, JR.
WILLIAM H. PARK, M. D.
M. P. RAVENEL, M. D.
FRANCIS H. SLACK, M. D.
PROF. A. R. WARD.

Veterinary Inspections and Protection Against Tuberculosis.

SAMUEL McC. HAMILL, M. D.
PROF. A. R. WARD.

Statistics of Milk-borne Mortality and Milk Charities.

HENRY L. COIT, M. D.
JOHN W. KERR, M. D.
ROWLAND G. FREEMAN, M. D.

American Association of Medical Milk Commissions.

FIRST SESSION.

Tuesday Morning, April 30, 1912.

The meeting was called to order at 10:00 o'clock, President Henry Enos Tuley in the Chair.

An address of welcome, upon behalf of the profession of the city of Louisville, was delivered by Dr. Edward Speidel, President of the Jefferson County Medical Society. Dr. Speidel said:

"Mr. President and Gentlemen of the Milk Commissions:

"On behalf of the Jefferson County Medical Society, composed of more than 250 physicians of Louisville and Jefferson County, I extend to you a hearty welcome, not only because you are the guests of our Milk Commission—a committee of our society of whose record we are justly proud—but because you are engaged in a work which so vitally affects the welfare of our community. Not many years ago the people of this locality especially watched the onset of hot weather with a great deal of dread and anxiety, in consequence of the train of gastro-intestinal diseases and typhoid which followed in its wake, to say nothing of the dreadful mortality among children, and especially bottle-fed infants, all due, as we later learned, to improper preparation of our milk supply. It is due to the efficient work of the Milk Commission that this dread and anxiety has been mitigated, if not entirely eliminated.

"A few months ago the medical profession of the world mourned the death of Sir Joseph Lister, the father of antiseptic surgery, and his passing brought to mind the conditions that existed before his epoch-making discovery. In those days suppura-

tion in wounds was the rule instead of the exception, and men of the highest intelligence spoke of 'laudable pus.' To the medical student of the present day, who only witnesses the magnificent paraphernalia of the modern operating-room, such conditions are incomprehensible, and yet they are easily paralleled by those that existed fifteen, yes, even ten years ago, in this community and in most of the cities of the United States in the production and collection of the milk supply for food consumption. Then tuberculous cows were chained day and night, without the possibility of obtaining fresh air and exercise, in filthy, dark, and dusty barns, reeking with manure; most of them fed with distillery slop, milked by dirty dairymen with dirty hands, put into unclean containers, water, formaldehyde and boric acid added, and the blue-white compound dumped upon the market as the daily food of infants and adults alike. That these statements are not overdrawn can be attested by every member of this Association.

"Now, conditions have been changed so radically, through the efforts of this organization, that the Kentucky State Medical Association was entertained with a banquet in a cow-stable two years ago when it met in the city of Lexington.

"Cows known to be free from tuberculosis in consequence of the tuberculin test, groomed like horses, in cement-floored concrete stables that can be flushed at a moment's notice; milked by dairymen in clean, white clothing, with clean hands, into clean receptacles; the milk at once properly chilled, bottled, and stamped with the certificate of approval of the Milk Commission. It is through the efforts of the Milk Commissions of this Association that such changes have been brought about, and the doctors as well as the laiety surely owe the Milk Commissions a considerable debt of gratitude.

"Both the profession and the laiety have become quickly educated to a proper appreciation of the work done by your Association, and it is with a feeling of disgust and horror that we realize how, for years and years, we swallowed that blue-white fluid, collected under such unsanitary conditions, which we at that time called milk.

"Fortunately for this city, the Jefferson County Medical Society early took definite action for the betterment of the milk supply of this city by establishing a permanent Milk Commission from amongst its members. How fortunate we were at the very outset in the selection of the members of that Committee is attested by the condition of affairs in this city at the present time. The work of our Milk Commission is known to you, I am sure, from the report presented at the last meeting of this Association, and I am told that it compares favorably with the best conditions in this country. Our Milk Commission not only has the hearty support of the medical profession, the city authorities and the laiety, but the dairymen, who at first were very antagonistic, now put themselves in touch with the Commission in order that they may receive the certificate showing that they are living up to the Commission's requirements.

"That there are still many important questions to solve in connection with this subject is proven by the fact that the gentlemen before me have gathered from the various parts of this country to learn how to improve upon established plans, and with the excellent program that has been arranged, much useful information should be gathered.

"And now, gentlemen, many years ago it was customary to conclude an address of welcome by calling the attention of the guests to Kentucky's three most valued possessions: our lovely women, our magnificent horses, and our excellent whiskey. That was in the remote and hazy past. We have progressed since then. We still have our lovely women, but we point with especial pride to their delicate, creamy complexions; our magnificent horses have been largely displaced by the automobile, but splendid Holsteins and Jerseys now ramble where the horse was wont to roam; as to whiskey—we now use that to preserve pathological specimens, and during your stay in this city, when you enter its hospitable mansions, you will be regaled upon every side with milk, gentlemen—Certified Milk, guaranteed to contain less than 10,000 bacteria to the cubic centimeter.

"Again, gentlemen, we bid you a hearty welcome; may your stay with us be a pleasant and a profitable one, and may your

deliberations redound to the benefit of yourselves, the medical profession, and all humanity."

The President called upon Dr. Henry L. Coit, of Newark, N. J. to respond to Dr. Speidel's address, which he did in the following words:

"I had not the remotest idea that I would be called upon. I do not think I shall attempt to respond to this address except to thank the President of the Jefferson County Medical Society for his felicitations and for his very inspiring remarks. I believe that we have begun a very auspicious meeting; that we have gathered here to enter upon deliberations that will mean a great step forward in the work for which we stand. I congratulate you, Mr. President, upon the interest which is manifested in the personnel of those present, and I bespeak for the Sixth Annual Meeting of the American Association of Medical Milk Commissions great success in their efforts to raise the standards and fix the regulations so as to make it possible for all Commissions to be harmonious in their work and in the results which they hope to obtain."

The report of the Secretary was next called for and was made by Dr. Otto P. Geier, Cincinnati, O., as follows:

REPORT OF THE SECRETARY.

"The secretary is so omnipresent all through the year that, on occasions like this, he should reduce to a very few words anything he may have to say to the Association.

"We measure the success of our individual efforts by the improvement in the work in a particular locality, but as the man in a central position, I measure the success of the Association by the extent to which new members have been added since the last annual meeting. It pleases me, therefore, to say at this time that the South has come forward very strongly this year in the formation of new Commissions. During the year, ten have been added. Of this number, two are in Alabama (Mobile and Birmingham), one in Canada (Victoria), one in Kentucky (Lexington), two in New York (Schenectady and New Rochelle), one in

Ohio (Youngstown), one in Pennsylvania (Erie), two in Tennessee (Nashville and Memphis), and one in Texas (El Paso)."

The report of the Treasurer was called for, and in the absence of Dr. Hamill, was read by the Secretary.

Report of the Treasurer of the American Association of Medical Milk Commissions, April, 1912.

Received in dues from 42 component commissions (4 for 2 years)..	$690 00
Received in dues from 29 individual members (11 for 2 years).....	120 00
Received from sale of Proceedings.....	288 60
Balance in Secretary's account in Cincinnati (for current expenses).	22 10
Balance from former Treasurer's account.....	193 34
Total.....	$1,314 04
Amount of expenses.....	1,164 34
Balance.....	$149 70
Overpaid by Dr. Otto P. Geier, Acting Secretary.....	50
Total Balance April 25, 1912.....	$150 20
Unpaid bill from The Methodist Book Concern.....	$360 25

It was moved and seconded that the report of the Treasurer be adopted as read. Carried.

The President next called for report of the proceedings of the Council, which was read by Dr. Isaac A. Abt, Chairman.

PROCEEDINGS OF THE COUNCIL, APRIL 30th.

Present: Dr. I. A. Abt, Chairman; Drs. J. J. Thomas, Henry L. Coit, John W. Kerr, Otto P. Geier, and Henry E. Tuley. Dr. Tuley read telegrams from Dr. Ogden M. Edwards and Dr. Samuel McC. Hamill, stating that they would be unable to attend the Louisville meeting.

The Council was called to order by the Chairman, Dr. Abt, at 9:15 P. M.

The report of the Treasurer was read by the Secretary. Moved and seconded that it be accepted. So ordered.

Moved by Dr. Tuley and seconded by Dr. Geier that the Treasurer be directed to apply the sum of $150.00 to the

Association's indebtedness to the Methodist Book Concern. Carried.

Moved by Dr. Tuley that the following Commissions, shown by the Treasurer's report to be delinquent in the payment of dues, be stricken from the membership list: Hartford, Conn.; Elmira, N. Y.; Indianapolis, Ind.; Patterson, N. J., and the New York Medical Milk Commission.

Motion seconded by Dr. Thomas and duly carried.

The secretary presented applications for membership in the Association from the Milk Commissions of the following medical societies:

El Paso, Tex.; Sacramento, Cal.; Youngstown, O.; Detroit, Mich.; Lexington, Ky.

Moved by Dr. Geier and seconded by Dr. Kerr, that the applications be accepted. After some discussion Dr. Tuley offered an amendment to this motion to the effect that the applications be accepted with the understanding that these Commissions will conform to the regulations and standards of the Association, copy of same to be submitted to them by the Secretary. Amendment accepted by Dr. Geier and motion carried.

The Secretary read a communication from Dr. Louis Tollins, of Newark, N. J., asking for information as to the requirements for individual membership in the Association; also letters from Dr. Stocking and Dr. Hamill relative thereto. Moved by Dr. Tuley and seconded by Dr. Geier that the Secretary be directed to quote to Dr. Tollins the section of the By-Laws relating to individual membership. Carried.

Dr. Kerr read a communication from Dr. Alfred Bell, Secretary of the Milk Commission of the Kings County Medical Society, written in response to a letter from Dr. Kerr enclosing a questionnaire, in which Dr. Bell, while conscientiously answering the questions, protested against what he termed "the magnification of details and specific demands upon the producers of Certified Milk," and questioned the authority

of the Association to restrict the use of the word "Certified" to those who comply with these specifications. Moved by Dr. Tuley that the Secretary be directed to write Dr. Bell a letter setting forth the fact that the status of the Association and its standards is moral rather than legal, and asking his co-operation in furthering the work. Seconded and duly carried.

Dr. Tuley stated that he had received by mail the following papers, with the request that they be read before the Association if there was room on the program.

Some Bacteriological Problems of Certified Milk, by P. G. Heineman, M.D., Chicago, Ill.

Methods of Examining Milk with the View of Securing Suitable Standards of Purity and Uniformity of Food Value, by Dr. Harvey W. Wiley.

Moved by Dr. Coit that Dr. Heineman's paper be read at a time to be selected by the President. Seconded and carried.

Moved by Dr. Thomas that Dr. Wiley's paper be read by title. Seconded and carried.

It was moved and seconded that the Commissions named in the report of the Council be elected to membership in the Association. Carried.

The President stated that he had been handed, by Dr. Robert Nelson, of Birmingham, the application of the Birmingham Medical Milk Commission for membership in the Association. Dr. T. C. McCleave, of Berkeley, asked permission to add to the list the applications of the Milk Commissions of Riverside and Santiago Counties, California. The President stated that, if the members of the Council who were present would waive the formality of recommending these Commissions, a vote would be taken immediately. It was moved and seconded that the Commissions be admitted to membership. Carried.

The President then called for reports of MILK COMMISSIONS.

Moved by Dr. Henry L. Coit that, as several reports had been sent in by Commissions not represented at the meeting, these reports be read and published in the transactions. Seconded and Carried.

The question of the publication of transactions of the Association was next discussed. Moved by Dr. Coit and seconded by Dr. Thomas that this be referred to the Publication Committee. Carried.

Moved by Dr. Coit and seconded by Dr. Tuley that, if practicable, the United States Public Health and Marine Hospital Service be asked to publish the manual of the working standards and regulations of the Association. Carried.

Upon motion, the meeting adjourned to reconvene on the morning of April 30, at 9:00 o'clock.

ADJOURNED SESSION.

April 30.

The adjourned session of the Council was called to order by the Chairman, Dr. Abt, at 9:00 A. M.

The report of the Committee on the Revision of Working Methods and Standards was discussed in detail. Upon motion of Dr. Tuley, duly seconded and carried, the committee was continued.

A communication from Dr. John R. Williams, of Rochester, N. Y., suggesting the appointment of a Committee to study the matter of public milk supply, was read. It was moved and seconded that the Council recommend the appointment of such a Committee. Carried.

The question of nominations of officers for the ensuing year was discussed, and the following recommendations were made:

For President, Dr. Ogden M. Edwards, Pittsburgh, Pa.; Secretary, Dr. Otto P. Geier, Cincinnati, O.; Treasurer, Dr. S. McC. Hamill, Philadelphia, Pa.

For Council, Dr. Henry L. Coit, Chairman; Dr. Jno. W. Kerr; Dr. J. J. Thomas; Dr. T. C. McCleave, Berkeley, Cal.; Dr. Jno. R. Williams, Rochester, N. Y.

Upon motion the meeting adjourned.

REPORTS OF COMMISSIONS.

REPORT OF THE ST. LOUIS PURE MILK COMMISSION.

By Mr. H. E. Mortland, St. Louis Mo.

In St. Louis there are four certified dairies in active operation. During the past year one has withdrawn. It was too far from the city to furnish milk within twenty-four hours. It is the concensus of opinion of the members of the Milk Commission of St. Louis that the product of any dairy not near enough to the city to furnish milk to the consumer within twenty-four hours should not be certified.

During the past year we have certified and distributed 750,000 quarts of milk, the dealer receiving for it 15 cents per quart. This is an increase of 8,000 quarts over the amount certified the preceding year. The city chemist and the city bacteriologist make weekly chemical and bacteriological examinations, and we have been able to reduce the bacterial count down to the limit of 10,000. During the past year only one count was above 15,000.

The amount of Certified Milk consumed in St. Louis is about one one-hundredth of the total milk supply. The certified dairies are inspected regularly once a month, and every case of sickness at a certified dairy is required to report to the Commission, and a physician is at once sent there and a close inspection made.

At the present time a Child's Welfare exhibit is being conducted in St. Louis, one booth being devoted to Certified Milk, and at this booth an individual cup of the milk is given as a sample to anyone who will take it. In that way I believe we will be able to interest a great many people in Certified Milk.

The death rate among babies in St. Louis last year was approximately 18.2 per cent, and that was a very good showing under present conditions in St. Louis.

REPORT OF THE MEDICAL MILK COMMISSION

Of Essex County, New Jersey.

By Floy McEwen, M.D., Newark, N. J.

The Medical Milk Commission of Essex County, New Jersey, extends greetings to her sister Commissions and at the same time is glad to be able to present to this conference the twenty-third report of its unique and important work.

New Building.

Since our last report three important additions have been made to the dairy plant—the new two-story brick building at the distributing station in Montclair, N. J., was completed June 1, 1911, while new dormitories for the men and a modern hospital building for sick employees have been erected at the farm in Caldwell.

The new building at Montclair contains on the first floor, space for electric trucks, a gasoline garage, space for twenty-eight delivery wagons, and the new ice-box.

Upstairs, over the wagon space, are thirty-eight stalls for horses, facing toward the center and separated by swinging partitions; over the ice-box is a room for feed and hay.

The new ice-box is designed to hold ten thousand quart bottles of milk and a temperature of 38° Fahrenheit is maintained. A nine-ton refrigerating plant has been installed and four tons of ice are produced daily.

Electric trucks from the farm at Caldwell reach the distributing station from 3:35 P. M. to 7:20 P. M., making three trips daily.

The first delivery wagons leave Montclair at 1:45 A. M. and continue to leave until 4 A. M. for all points.

Summer service along Jersey Coast.

During the summer months, beginning about June 19, three wagons give service along the Jersey coast from Long Branch to Spring Lake. About one thousand quarts are sold there daily.

Disposition of bottles from houses in quarantine.

The building for the washing and sterilizing of bottles collected from houses in quarantine for contagious diseases is situated at Montclair, and such bottles are first brought here and sterilized before being taken to the farm.

New Infirmary.

The new infirmary for the treatment and isolation of sick employees follows in construction the plans outlined by the Committee on Sanitation, and is a model of its kind.

New Dormitories.

The new dormitories for the men is a two-story modern brick building, with accommodations for thirty-six men.

Shortage in Milk Supply during Summer of 1911.

As a result of the intense heat which prevailed during the summer of 1911, the animals were unable to eat and the milk was correspondingly reduced in quantity. On July 6, 1911, it was estimated that the output of the dairy was three hundred quarts short daily, and by July 12, 1911, the shortage was one thousand quarts daily. To offset in a measure the effects of this extreme heat, the animals were fed less meal and gluten and more beet pulp and bran; the drinking troughs were kept filled with water, and the animals were turned out to pasture at night.

Stewart Test.

The Stewart test is being applied to the milking herd. The work is being pushed as fast as practicable. So far fifty-five animals have been examined, of which six showed a high leucocyte count.

Cultivation of Alfalfa.

During the past three years the dairy has been experimenting with alfalfa, seventy-five acres being given to the cultivation of this plant. Four crops are gathered each year, and the experiments so far have proven highly satisfactory.

Regulations Governing Medical Supervision of Employees.

In order to conserve the public health, guard against the contamination of the milk, and so prevent the spread of milk borne diseases, the following additional provisions relating to the medical supervision of employees have been adopted by the Commission, and are now a part of its working schedule:

Visits of Attending Physician.

The attending physician shall make not less than two examinations of the employees at the dairy each month, and a written report of such visits and examinations shall be made by the attending physician on a printed blank form furnished for that purpose, and be sent to the chairman of the Committee on Sanitation every two weeks.

Examination of New Applicants for Employment.

Before any person shall come on the premises to live and remain as an employee, such person, before being engaged in milking or the handling of milk, shall be subjected to a complete physical examination by the attending physician. No person shall be employed who has not been vaccinated recently or who upon examination is found to have a sore throat or to be suffering from any form of tuberculosis, veneral disease, conjunctivitis, diarrhea, dysentery, or is proved to be a tyhpoid carrier, or who has any inflammatory disease of the respiratory tract or any suppurative process or infectious skin eruption or any disease of an infectious or contagious nature, or who has recently been associated with children sick with contagious disease.

Examination for Baccilus Carriers.

In the case of all new employees special examinations shall be made of the nose and throat and intestinal tract, and cultures

taken and made to determine the presence of diphtheria or typhoid baccilus carriers.

Prevention of Contagious Outbreaks.

In the event of any illness of a suspicious nature, the attending physician shall immediately notify the secretary of the Commission, and in every inflammatory affection of the nose or throat occurring among the employees of the dairy, the attending physician shall take a culture and send it at once to some competent bacteriologist for examination. Pending such examination the employee or employees shall be quarantined.

It shall be the duty of the secretary on receiving notice of any suspicious or contagious disease at the dairy, at once to notify the Committee on Sanitation of such report.

On receipt of the notice, the Committee on Sanitation shall assume charge of the matter, and shall have power to act for the Commission as its judgment dictates.

As soon as possible thereafter, the Committee on Sanitation shall notify the Commission, through its secretary, that a special meeting may be called for ultimate consideration and action.

Rules Governing Delivery and Collection of Bottles From Houses in Quarantine.

All delivery clerks must mark on delivery book daily the number of bottles returned from cash customers. In cases where houses are quarantined, the delivery books must be marked as such, and notice also given to the superintendent of routes.

Delivery clerks must not enter houses in quarantine, or collect bottles or accounts therefrom.

Tuberculin Testing of the Cattle.

The custom of applying the tuberculin test to all cattle before purchase, which has prevailed at this dairy for a number of years, still continues. As pointed out elsewhere, the requirements of the Commission necessitate the sending of the Commission's chief veterinarian to the upper part of New York State and other distant localities to make the test in person before shipment of the

cattle is made to the dairy. All cattle reacting are rejected, so that only those showing a clean bill of health are admitted to the farm. The Commission feels that much credit is due Mr. Francisco for cheerfully carrying out the requirements of the Commission in this matter, adding greatly as it does to the cost of milk production.

Price of Certified Milk.

Certified Milk now sells in Essex County for 15 cents a quart.

Quantity Produced Daily.

About 2,500 quarts are produced daily.

As the scope of the Commission is professional, and has reference solely to the production of milk for clinical purposes, and as it is not designed to guarantee dairy products for domestic purposes, this Commission has so far not certified to anything but milk.

Co-operation of Mr. Francisco and the Dairy Heads.

The cordial and responsive way in which Mr. Francisco of the Fairfield Dairy meets the requirements of the Commission, though often at greatly added expense, is one of the gratifying features connected with this unique work, and the hearty and loyal co-operation of not only Mr. Francisco himself, but of his son and, indeed, all the division heads, has done much to make the work of the Commission effective.

REPORT OF THE MILK COMMISSION OF THE TORONTO ACADEMY OF MEDICINE.

By J. H. Amyot, M.D., Toronto, Ont.

There have been no outbreaks of disease in any of our herds for the past year. We ask a bacterial count not greater than 5,000 in the winter months and 10,000 in the summer months. On two or three occasions the count has gone above the required number, but upon being checked up they came back to normal again. We have had quite a number of counts ranging from 250

to 600, but during the past eight or ten months they have run along at about 4,000 or 5,000.

As to butter fat, one dairy, with a Holstein herd, has given pretty uniformly 3½ per cent butter fat—sometimes below that. The mixed herds have given quite uniformly 4 and 4½ per cent butter fat, with a corresponding percentage of total solids.

All of the animals have been tuberculin tested. Our veterinary surgeon goes once a month to the dairies and tuberculin-tests all new cows that are to be added to the herds. Last year for Dairy No. 1 he made 287 tests; for Dairy No. 2, 189; for Dairy No. 3, 112; for Dairy No. 5, 388. Many of these were retests.

RESULTS OF MONTHLY COUNTS IN 1910, 1911, AND 1912.

NAME OF DAIRY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1910.												
No. 1	.....	.....	....	.....	....	....	....	....	600	500	700	2,600
No. 3	.....	.....	....	.....	....	....	....	....	500	1,100	.....	1,700
1911.												
No. 1	2,800	Ster.	400	300	500	600	500	200	800	650	2,000	.....
No. 2	1,300	3,100	100	200	.....	2,200	400	7,700	16,000	13,200	150,000	11,000
	20,000	.....	....	.....	....	....	....	....	1,100	.....	4,300	.....
No. 3	2,000	1,700	3,000	1,500	4,000	7,600	1,000	9,800	68,000	8,400	9,300	13,000
	.....	.....	....	.....	....	....	....	....	4,600	.....	5,400	.....
1912.												
No. 1	4,300	15,000	100	1,900	....	....	....	....	.....	.....	.....	.....
	.....	3,000	....	.....	....	....	....	....	.....	.....	.....	.....
No. 2	3,000	1,500	2,000	1,500	....	....	....	....	.....	.....	.....	.....
No. 3	9,000	3,000	1,300	13,000	....	....	....	....	.....	.....	.....	.....

Of these, 478 were healthy, while 60 showed a very suspicious or a positive reaction to the test. The suspicious ones were of especial interest in this way: The tuberculin-testing of these herds commenced two years ago, and each year some of those that got through on the first test have reacted. For instance, the second test at Dairy No. 2 showed no reactors; third test, 1; fourth test, none; fifth test, none. At Dairy No. 1, the second test showed 2 reactors; third test, none; fourth test, none; fifth test, 2. Therefore it would appear that there were two cows that got through four tests all right, but were positive on the fifth test.

As to those that were distinctly tuberculous, the following figures are interesting:

Dairy No. 2: Second, third, fourth, and fifth tests showed none.

Dairy No. 3: Second, third, and fourth tests showed none; fifth test, 3.

Dairy No. 1: Second test, 3; third, 1; fourth, 2; fifth, none.

We have succeeded in having Certified Milk defined by the government, as well as Pasteurized Milk, and both of them are included in the pure-food regulations of the country. Certified Milk cannot be so styled unless certified by a regularly qualified Milk Commission; Pasteurized Milk is that which has been heated to 145°, maintained for half an hour, and then cooled.

NUMBER OF TESTS APPLIED DURING 1911.

City Dairy	189	
Manor Farm	112	
Price & Sons	237	
Total		538

Healthy Animals.

City Dairy	172	
Manor Farm	97	
Price & Sons	209	
Total		478

Suspicious Animals, and Number of Previous Tests.

	Tests:						
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.		
City Dairy	7	0	1	0	0	= 8	
Manor Farm	4	0	1	0	2	= 7	
Price & Sons	4	2	0	0	2	= 8	
							23

Tuberculous Animals, and Number of Previous Tests.

	Tests:						
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.		
City Dairy	9	0	0	0	0	= 9	
Manor Farm	4	1	0	0	3	= 8	
Price & Sons	13	3	1	2	1	= 20	
							37
Total							60

In this report the dairies are named Nos. 1, 2, and 3. Quantity of Certified Milk now daily sold in Toronto is, approximately: No. 1, 512 quarts; No. 2, 220 quarts; No. 3, 51 quarts. During year 1911: No. 1, 228 quarts; No. 2, 120 quarts; No. 3, 60 quarts. During the year 1910: No. 1, 110 quarts; No. 3, 65 quarts. There have been no outbreaks of disease on any of these supplies.

Fats: No. 1 has averaged 4.50 per cent butter fat; No. 2, 4 per cent, and No. 3, 3.50 per cent.

REPORT OF THE MILK COMMISSION OF THE MEDICAL SOCIETY, COUNTY OF KINGS, NEW YORK.

By Louis C. Ager, M.D., Brooklyn, N. Y.

In 1910 we certified 1,083,000 quarts of milk; in 1911, 1,259,000 quarts; a marked increase. In the first three months of 1911 we certified 281,000 quarts, while in the corresponding months of 1912, 361,000 quarts were certified; an increase of about 80,000 quarts, or 28 per cent. If this rate of increase keeps up throughout the year, it will be very gratifying to our Commission.

I suppose practically every Milk Commission has a different plan of carrying on its work. Our method is to have the producer pay for the certification of the milk in proportion to the amount he produces. We have this year been able to reduce the cost of certification from $4.50 to $3.75 per thousand quarts.

The most important event of the year has been the fact that the Borden Company has come in with us in the certification of the milk it uses. This is particularly gratifying because the Borden Company is the largest company in the milk business in New York, and was at one time one of the most virulent and unscrupulous opponents of Certified Milk. They have now seen the light and are putting a large amount of money into the certification and sale of milk.

The prevailing price of Certified Milk is 15 cents per quart, although some firms are selling it at 14 cents.

ANNUAL REPORT OF MONTGOMERY COUNTY MEDICAL SOCIETY MILK COMMISSION.

A. H. Lane, M.D., Dayton, Ohio.

The Milk Commission of this society respectfully submits herewith its annual report for the year 1911, being the fourth annual report since its establishment.

The past year has been the most active one in our history and the one productive of the most good along the various lines of our endeavor. The work has been broadened and made more comprehensive by our affiliation during the year with the Flower and Fruit Mission, by which association we were able to establish a free milk station, where milk could be properly modified and prepared ready for use for any who may want it. Those able to pay are charged and those unable to pay are given the milk free of cost.

This station has five formulæ which are standard, and is able to prepare any formulæ which may be presented.

There is a graduate nurse constantly in charge in the preparation of formulæ, and when her time is not required at the station she is out investigating the worth of those requiring free milk and assisting and teaching the mothers in the care of their babies.

Free clinics for infants are held three times a week: on Monday, Wednesday, and Friday, at 3 P. M., where a general supervision of the infants receiving free milk is maintained.

The Commission has also affiliated with the Central Council of Social Agencies, by which we hope to profit greatly when this organization becomes well established.

Our efforts toward the betterment of the milk supply have been untiring. At the Gascho Dairy during the year they have erected a new milk house, modern and up to date in every particular, containing separate bottling-room, wash-room, and storage, with complete ice-making machinery on first floor and a place for bathroom and lockers for the accommodation of attendants, and a milk laboratory on the second floor. The highest number of quarts of milk sold per day during the year was 800. Certified Milk retails at 10 to 12 cents per quart.

The high standard of the milk has been maintained through most trying conditions on account of the building of the new milk house and the temporary failure of the water supply necessitating very extensive and tedious work in the way of putting in new and larger wells. The supply now is unfailing and abundant, 48 gallons per minute being pumped for twenty-four hours without exhausting the supply.

Twenty-nine bacterial counts were made during the year. Forty-one visits of the veterinary were made to the dairy, and ninety-eight cows and one bull were tuberculin-tested, two cows and the bull being condemned and slaughtered. Eleven chemical analyses of the milk were made, the average being well up to the standard.

The dairy was visited and inspected during the year at various times by every member of the Commission, the total number of visits made aggregating sixty-five separate visits; an average of more than one a week.

The Commission adopted a new and more efficient seal for the protection of the contents of the bottles. This seal can be put on only by machine which is kept at their dairy, thus making it impossible for the driver to substitute an inferior milk. The seal is the property of this Commission and we have the exclusive use of this locality, making it impossible to imitate the package in any way. It has simplified our control of the sale of the Certified Milk, for if the standard we require is not maintained, it is a simple matter to withhold the seals and prohibit their use.

During the year 157 babies were fed on free milk distributed to their homes, and 32 babies were furnished Modified Milk free of cost at the milk station.

Since the establishment of the clinic eighty-seven babies have been treated. Their average age was eight months, ranging from six weeks to two years. The average length of time was seventy-five days and the average cost was nine dollars. Of the babies so fed during the year, only one has died, to our knowledge, and we have made a special effort to ascertain the condition of all so fed and they are all thriving.

Our Commission gave an exhibit last week for the purpose of

educating the public along the lines of pure milk. Sixteen lectures were given, together with illustrations by lantern slides. Much interest was manifested by the public, as evidenced by the fact that the room was crowded to its full capacity, while many remained standing throughout the lectures.

The Commission suffered the loss of an active and interested member during the year by the death of Dr. J. S. Beck.

REPORT OF THE MEDICAL MILK COMMISSION OF WAYNE COUNTY, DETROIT, MICHIGAN.

For a period between 1902-08 a Committee or Commission of the Wayne County Medical Society was appointed annually, charged with the duty of placing within reach of the profession such a grade of milk as is known as "Certified." For various reasons this desirable result was not arrived at and no legitimate Certified Milk was placed on the Detroit market.

In 1909 the Detroit Board of Health adopted as rules and regulations for milk certification those in use by the Medical Milk Commission of the County of New York, and announced that it would certify the milk of any dairyman who complied with them. The advisability of this step had been discussed between the health officer and the chief milk inspector for two years, but the idea had always been abandoned because it was the history of Certified Milk in other places that this step be taken by a county medical society. Inasmuch as no society was certifying milk or making inspections, or offering inducements to dairymen to produce such an article, and as a number of dairymen were fraudulently branding ordinary market milk as "Certified," and as the profession and public were calling upon the board of health to recommend such a grade of milk, this action was taken on the above date.

Thereupon the dairymen fraudulently using the word "Certified" were compelled to abandon it, and did so, but for more than a year no dairyman was found with such excellent an equipment and methods as to be deemed worthy of the use of this name, nor one whose supply the Board of Health cared to guarantee.

In May, 1911, the Detroit Board of Health certified the milk produced on the Church Farm. This farm consists of more than six hundred acres, is in charge of Homer C. Teal, graduate of Cornell Agriculture College, and at the time of the certification the dairy consisted of eighteen cows. This dairy scored ninety-three on the score card of the Dairy Division of the United States Department of Agriculture. Before the summer was over there were seventy-nine animals in this herd, and it was a serious question to know how to provide a supply of Certified Milk to meet the demand.

On August 1, 1911, the new statute covering Certified Milk went into effect. This statute is a duplicate of the New Jersey law, except that Medical Milk Commissions are appointed by the local board of health when such board has two registered physicians on its membership, otherwise the State Board of Health appoints these Commissions. The Detroit Board of Health appointed a Medical Milk Commission of Wayne County consisting of five physicians who were, with one exception, all members of the old Medical Society Commission. This Commission has approved the action taken by the health board and continues the certification of the Church Farm milk. It has also certified the milk produced on the Ingleside Farm, so that now twelve hundred quarts of Certified Milk are distributed in Detroit daily, whereas up to a year ago there were none.

In addition to the requirements mentioned above, the Medical Milk Commission of Wayne County requires for certification a dairy that scores above 90 on the score card of the Dairy Division of the United States Department of Agriculture, and that a graduate of an Agricultural College be in charge as head dairyman. It is required also that the tuberculin-test be applied twice yearly and that all reactors shall be slaughtered, subject to United States inspection. Of all of our reactors so slaughtered, tubercular lesions have been detected in 100 per cent.

Last fall the head dairyman on our Certified Farm contracted typhoid fever and was removed, and not allowed to return until it was proven bacteriologically that he was not a carrier. This follows the action taken by the board of health in such cases

affecting the general milk supply. At no time have we had any trouble with the bacterial count. All counts have been uniformly below 10,000.

REPORT OF THE MILK COMMISSION OF THE MONROE COUNTY MEDICAL SOCIETY, ROCHESTER, N. Y.

By John R. Williams, M.D., Rochester, N. Y.

In all, about 10 per cent of the milk supply of Rochester is Certified Milk. There are about twenty-five thousand children under five years of age in Rochester and, without having any definite data at hand, it is my opinion that about one thousand of those children are being fed on Certified Milk. When we consider that a large proportion of children are not fed on milk, it will be seen that this is a fair percentage of milk-fed children that are being given Certified Milk.

We have investigated the distribution of Certified Milk throughout the city, and find that it goes to all quarters. All classes of people use it, which is contrary to the usual idea that it is for the rich only.

The Milk Commission of Rochester has greatly extended its work. During the past year we have had two educational booths at industrial exhibitions. Probably 225,000 people visited the first one, and last week we had one which was visited by 25,000 people, who were given literature descriptive of our work.

REPORT OF THE MEDICAL MILK COMMISSION OF UNION COUNTY, NEW JERSEY. No. 2.

The Medical Milk Commission of Union County, N. J., No. 2, known as the Milk Commission of the Union County Medical Society, has been in existence since November 10, 1909. In July, 1910, we entered into an agreement with Mr. Joseph S. Frelinghuysen, doing business under the name of Raritan Valley Farms at Somerville, N. J., and since that time have certified the product of this dairy. The product of Raritan Valley Farms is also certi-

fied by the Milk Commission of Hudson County, N. J., and New York County, N. Y. Our physicians have been, I am sorry to say, very slow in recommending the milk, and I attach the following report submitted to the County Society at the January meeting:

"January 10, 1912.

"The Committee of the Milk Commission of your Society submits the following report to you:

"The output of Certified Milk in the city of Elizabeth at the present date is one hundred quarts daily, a poor showing after a year and a half of existence of the Commission, considering that the average amount of milk used in this city is nearly twenty thousand quarts a day. Cranford uses 16 quarts; Plainfield, 12 quarts; Westfield, 34 quarts; while Jersey City uses 170 quarts daily.

"The amount of 162 quarts of clean milk used in this county could not begin to pay the expense of running the plant at Raritan Valley Farms, if there would be no other market for this product.

"The report of our bacteriologist, Mr. Richards, shows the high standard of the milk of Raritan Valley and is as follows:

Feb. 26, 1911.—	1 ccm.	contains	700	bacteria.
Mar. 19, 1911.—	"	"	1,200	"
Apr. 6, 1911.—	"	"	1,200	"
May 16, 1911.—	"	"	1,100	"
June 7, 1911.—	"	"	1,550	"
July 14, 1911.—	"	"	2,100	"
Aug. 17, 1911.—	"	"	1,900	"
Sept. 20, 1911.—	"	"	4,300	"
Oct. 11, 1911.—	"	"	5,100	"
Dec. 8, 1911.—	"	"	2,600	"

"The amount of fat has averaged from 4 to 4.5 per cent.

"The report of our medical examiner, Dr. Hecht, and of our veterinary examiner, Dr. Voorhees, is satisfactory.

"There are seventy-four cows in the herd, of which three were slaughtered during the year on account of positive tubercular reactions. Respectfully submitted,

"E. B. GRIER, *President;* E. W. HEDGES,
"S. T. QUINN, ARTHUR STERN, *Secretary,*
"J. B. HARRISON, Per M. C."

REPORT OF THE MILK COMMISSION OF THE NEW ORLEANS PURE MILK SOCIETY.

Robert H. Polack, Secretary-Treasurer.

During the past year the work of our Milk Commission has progressed steadily, though slowly, and we are pleased to report that two additional dairies have come under our supervision, making four dairies in all complying with our regulations and under contract to produce Inspected Milk. Continued efforts have been made to get other dairymen to produce Inspected or Certified Milk, and we are confident that a much greater quantity of this good milk can be sold if dairymen will produce it.

All of our dairymen have shown themselves capable of producing a high-class article and on most occasions bacterial counts show well under our requirements. Seldom have they been exceeded, though in a few cases we found one of the dairymen was not using a sufficient quantity of ice, causing his count to run up.

All cows in the herds of the Commission dairies have been tested for tuberculosis and the herds in the first two dairies coming under our supervision have been retested after one year. In all cases where cows have shown a reaction the animal has been slaughtered under United States Government inspection and the infected parts shown to the dairymen if they cared to see them. The Commisson now has an arrangement with the Bureau of Animal Industry, Department of Agriculture, United States Government, not only for testing the herds for tuberculosis, but also for the local veterinarian of the department to make a physical examination of all the cows whenever he goes to the dairies to make tests.

The Commission, through its regularly employed inspector, has done a considerable amount of missionary work among the local dairymen endeavoring to get them to better the general conditions surrounding their barns, and in this connection we are glad to report that a campaign by the State Board of Health for better sanitary conditions has been in progress for some weeks, and the Milk Commission has assisted in this work in so far as the dairies are concerned, instructing the Board inspectors

how to properly score dairies. Our inspector has also done a large amount of the scoring for the Board of Health and assisted in a campaign of education among the dairymen. As a result of the campaign twenty-five dairies have been forced to close and discontinue the sale of milk on account of filthy conditions. In some cases the courts have had to be appealed to and injunction proceedings instituted to enforce the sanitary laws. In most cases, however, the dairymen have accepted the instruction given by our inspector in an aggreeable way and have made the necessary changes and improvements to bring them within the law's regulations.

Our Commission is financed by membership dues of five dollars per annum by citizens interested in good milk, but so many of our members have resigned after paying one or two years' dues that we will probably be compelled to give up the employment of a regular inspector and arrange to have periodical tests, counts, and inspections made by local physicians and members of the Milk Commission. We also make a charge of one cent per gallon to the dairymen using our caps, and when the sale increases to a sufficient amount we can then employ an inspector regularly and continue our educational work among the dairymen.

We herewith give you the officers and members of the Commission:

Dr. W. W. Butterworth, President; Dr. I. I. Lemann, Vice-President; Robert H. Polack, Secretary and Treasurer.

Members of Commission: Dr. G. K. Logan, L. R. De Buys, Dr. M. T. Lanaux, Dr. C. H. Rice, Mr. Jos. T. Devereux.

Our annual election takes place on May 6, at which time new officers will be elected.

REPORT OF CALIFORNIA ASSOCIATION OF MEDICAL MILK COMMISSIONS.

T. C. McCleave, M.D., President Alameda County Commission; President California State Association.

This Association consists of the Commissions of Alameda, Los Angeles, Riverside, San Diego, and San Francisco Counties. The Association was formally organized in 1911, though meet-

ings were held during the two previous years under the initiative of the San Francisco Commission.

Its purposes are to promote in every possible way the development of the Certified Milk industry, to harmonize the work of the various county Commissions and insure uniformity of requirements, and to protect the term "Certified Milk" against improper use.

The California Commissions are very active in the propaganda for Certified Milk. At the session of the Legislature, three years ago, we secured the passage of a statute assuring us control of the name "Certified Milk," and one year ago a similar law in reference to Certified butter, and other milk products, was obtained.

During the past year numerous illustrated lectures have been given to lay and medical audiences in all parts of the State; and, through the courtesy of the University of California, a milk conference and exhibit were held at the time of the university summer session, which were very largely attended by members of the medical profession, milk producers, students, and the public, and aroused a very gratifying interest. A similar meeting is planned for this fall for the California League of Municipalities, an important civic organization; and the university has again extended a courtesy to the Milk Commissions by inviting the President of the Association to deliver one of a series of lectures on "Public Hygiene" at the coming session of the summer school. Thus it may be seen that our people are being awakened to the value of a pure milk supply; and in addition to the growing demand for Certified Milk, a very appreciable raising of the level of the general milk supply has resulted from the activities of the Commissions.

The Alameda County Commission had occasion during the year to conduct an investigation with reference to the persistence of formaldehyde in milk, which is of some general importance. Incident upon a small local epidemic of enteric disturbance in children fed upon Certified Milk, the city chemist of Alameda claimed to have found formaldehyde in samples of the milk submitted to him. The Commission made a careful investigation of all facts appertaining to the matter, and disputed the chemist's

conclusions. After some days, it came to our knowlegde that the chemist still had in his possession a small portion of the original sample in which he claimed to have found formaldehyde. This we secured, and tests made by our chemist—the milk being then thirteen days old—proved negative. The claim was then made that our results were inconclusive, because formaldehyde tends to rapidly disappear from milk, and by the end of thirteen days, even if present originally, would fail to give a positive reaction.

To test the validity of this claim, our chemist, Professor Jaffa, of the University of California, was requested to make a series of experiments. The results may be summarized as follows:

1. Dilution of 1 part formaldehyde in 25,000 of milk, test positive for 13 days.
2. Dilution 1 to 10,000, test positive 38 days.
3. Dilution 1 to 8,000, test positive 61 days.
4. Dilution 1 to 5,000, test positive 103 days.
5. Dilution 1 to 10,000, thoroughly shaken, poured from one bottle to another many times, exposed to air for several days, kept at temperature 75 to 85 degrees Fahrenheit, test positive 27 days.

These findings differ from the published results of a few other investigators, which indicated the rapid disappearance of formaldehyde. Our experiments prove that formaldehyde, added to milk in as low a dilution as 1 to 10,000, may be detected for a period of at least four weeks, the milk being kept in the meantime under any ordinary possible conditions; or, in other words, if formaldehyde were present in milk in quantities sufficient to produce any harmful effect, it could be detected for many weeks.

The report of the component Commissions of the California Association may be tabulated as follows:

COMMISSION.	ORGANIZED.	NO. DAIRIES CERTIFIED.	NO. OF QTS. DISTRIBUTED DAILY.
Alameda County	1905*	4†	2,425
Los Angeles County	1906	1	1,700
Riverside County	1911	1	140
San Diego County	1911	1	170
San Francisco County	1906	3‡	3,250
Total Commissioners	5	8	7,685

* As Home Club Commission.
† 2 jointly with S. F.
‡ 2 jointly with Alameda.

REPORT OF CLEVELAND (OHIO) MILK COMMISSION.

The Cleveland Milk Commission reports a successful but uneventful year. The chemical and bacteriological standards adopted have been maintained as heretofore.

Twenty bacterial counts were made by the bacteriologist during the past year. The highest count for the year was 18,000 (September 19), the lowest 864 (December 2). Five counts were above the 10,000 standard (25%). Two (10%) were exactly 10,000, and 13 (65%) were under 10,000. The average for 20 counts was 7,388.

The temperature of nineteen specimens of milk tested varied from 39° to 49°; average, 44.5° F.

The chemical examinations made every three months have always revealed a milk well within the requirements of the Certified grade. These examinations include a search for preservatives, coloring matters, and adulterations.

The health of the employees has been uniformly good, and no communicable diseases have been reported during the year among them or their families.

The elimination of tuberculosis still appears to be one of our chief problems. In spite of approved testing methods and the re-test with large doses of tuberculin, the annual test always reveals some reactors. Four animals reacted positively at our last test, out of one hundred and thirty-four tested. These reactors were butchered, and the stables, stalls, and stanchions scrubbed, disinfected, and fumigated under the supervision of our verterinarian.

The records of these tests are now shown to and approved by the city veterinarian, enabling our producer to have practically a perfect score at the farm. Formerly this was not posible because of the lack of co-operation between the Commission and the City Health Department. This is largely due, probably, to the fact that the secretary of the Commission is now a member of the Board of Health.

The demand for Certified Milk is increasing slowly, but the influence of the Commission in raising the standards of other

grades of milk is noticeable. Recently our Commission has been approached by our largest milk dealer and a request made that the Commission supervise the production of its special nursery milk, and, if found coming up to the standards and requirements necessary, that it be sold as Inspected Milk.

At present only one farm will probably come up to such a standard, but eventually several others will be added, resulting in the Commission's supervising the production of two or three thousand quarts of milk and cream daily to be sold as "Inspected Milk and Cream." This grade of milk will sell for twelve cents, and is on the market in response to a growing demand for a clean, raw milk from tuberculin-tested cattle and sold at a moderate price. The price of Certified Milk will remain at eighteen cents per quart, ten cents per pint.

A recent change and improvement has been made in the sealing of our Certified Milk. The old method of manual sealing with the pulp cap has been discarded and all-metal seal, similar to such as are used on beer bottles, substituted.

The Belle-Vernon Dairy Company has recently taken over the entire retail and laboratory end of the business of the Walker-Gordon Company. This will eliminate a powerful competitor to Certified Milk in that their nursery milk will now become the Inspected grade—all produced under the supervision of our Commission.

The delivery of these grades of milk will become more prompt and uniform, and the confusion arising from such terms as nursery, table, and special tuberculin-tested milk eliminated.

Cleveland will then have simply three grades of milk:

(1) Certified Milk	18 cents quart
(2) Inspected Milk	12 cents quart
(3) Market Milk (pasteurized and raw).....	8 cents quart

A special meeting of the Commission was called September 1, 1911, at which a product known as "Eiweiss Milk" was discussed, and a committee, consisting of Drs. H. J. Gerstenberger and J. J. Thomas, was appointed to investigate further and report upon this product. At a subsequent meeting it was decided to supervise the manufacture of this product produced by the

Walker-Gordon Company under rules and regulations to be hereafter drawn up.

It is hoped thus to standardize and control the production of this important food, which requires painstaking methods and a special technique.

Samuel Mather, Esq., Western Reserve Building, President.
Dr. H. J. Gerstenberger, Osborn Building.
Dr. H. H. Powell, 2714 Prospect Avenue.
Dr. S. W. Kelley, 2255 East Fifty-fifth Street.
Dr. H. D. Bishop, 762 Rose Building.
Dr. E. O. Adams, 11307 Hessler Road.
Dr. J. J. Thomas, Secretary and Treasurer, 1110 Euclid Avenue.
Dr. A. F. Furrer, Assistant Secretary, 1110 Euclid Avenue.

REPORT OF THE CHICAGO MEDICAL SOCIETY MILK COMMISSION.

By J. W. Van Derslice, M.D., Chicago, Ill.

In Chicago we have received applications from two or three small firms for certification of their milk. One man there has ten pure-bred cows, and his wife and family do practically all the work on the farm. At the price for certification, which means bacteriological examinations once a week, farm inspection once a month, with the addition of a certain amount for office expenses, the cost is about $300 a year for each farm. It is simply out of the question for a man with ten cows to pay $300 a year for certification, yet, at the same time, it is a great injustice to a man with ten cows, who turns out a product equal to other milk that is Certified, to deny him certification. Our method of prorating is unjust, because we charge the man with fifteen cows the same as we do a man with one hundred and fifty cows. We started that way, and have not had sufficient pressure brought to bear to make us change. Therefore, what are we going to do with the small farm? Personally, I am satisfied that the smaller the farm, the lower the bacterial count.

We do not have much trouble in connection with the ship-

ment of Certified Milk. We have a car backed into Genesee Station, Wisconsin, which is loaded in the evening, brought down to Milwaukee, and from there sent down to Chicago, arriving there between ten and eleven o'clock. It is met by the distributor, who checks it to the various stations, from whence it is delivered the next morning. We have another car which is loaded at Earlington, Illinois. Two of our farms send in their milk by automobile truck, the evening milk reaching Chicago between six and seven o'clock. Two other farms, separate from these two groups, send their milk in by express, but all the milk reaches Chicago within four to six hours after it is loaded at the station.

In regard to the influence of Certified Milk in Chicago, I will speak of this from the standpoint of the producer. We have five or six what might be called certification districts, and I believe that the producers in each of these districts have been stimulated to better their own products. They have the opportunity of seeing the practical application of production of pure milk. Some of our farms have not very expensive equipment. For instance, in two of them it required only $1,600 to change them from commercial milk farms to Certified Milk farms. These farms supply milk which, in one eighty-four per cent, and in the other, eighty-two per cent of the total bacterial counts made each year run under five thousand. Four weeks out of five they will be in the first five. I believe, when we consider that other producers around these farms see these men, with ordinary stables and a comparatively small outlay of cash, turning out milk as pure as this, it will prove to be a great educational factor in the campaign for the betterment of the milk supply.

REPORT OF THE EL PASO COUNTY MEDICAL SOCIETY MILK COMMISSION.

By J. A. Rawlings, M.D., El Paso, Texas.

We began the formation of our Commission last October, but previous to this the Health Board had taken up the matter of pure milk and had gone a long ways toward getting the dairies

in our vicinity worked up to a better standard of milk. Now the Health Board and the Commission are working together. The Commission began its work last October, and it has taken us until the present time to get into position to begin certifying milk. When I left, it appeared that, within a week or ten days, Certified Milk would be given to the people of our town. Our people have conditions to contend with that are somewhat different from those of other sections of the country. Our cows require no shelter except a shed, but we have one element to fight against which is peculiar to our section of the country, namely, our great sand-storms. It is almost impossible in our city to put up a building that will be dust-proof. I do not know how we are going to overcome this, but the man whose product it is intended to certify is erecting a building which he claims will be as near air-tight as it is possible to make it. The price of Certified Milk will be 25 cents a quart; commercial milk sells for 10 and 12 cents a quart. We have a food for our cattle that surpasses everything in the way of a milk producer. Those of you who come from the same region know what a great milk producer alfalfa is, and that is the chief food of our cattle. We do not know how the public is going to receive our product, and for the present we are arranging to certify the product of a herd of only twenty-five cows. We are going to try to educate the public in the use of Certified Milk, and we believe that we will be able to sell the output of twenty-five cows right from the start.

REPORT OF THE HENNEPIN COUNTY MEDICAL MILK COMMISSION.

By George D. Haggard, M.D., Minneapolis, Minn.

Hennepin County has had a Medical Milk Commission for four years, but Certified Milk was introduced in Minneapolis only about two months ago. The first attempt to certify milk was made ten years ago, which soon failed. Then another one went the same way. The present dairy will no doubt succeed. It produces about eighty-five quarts of Certified Milk per day, and sells most of it to hotels, restaurants, and dining-cars.

The recent efforts of the Commission to put Certified Milk on the market first met with defeat, and we introduced Inspected Milk with a bacterial count under 50,000. The express companies would only respond to a mandate from the Railroad Commission to make a rate that was not prohibitive. Prior to this the rate was 2½ cents per quart; it is now 1 cent, and should be ¾ of a cent.

Certified Milk is brought a distance of ten miles, from an excellent dairy of Holsteins, and is received in the city, properly bottled and cooled, with a bacterial count under 10,000. The milk comes at night and is delivered in the morning by a general milk delivery system which produces no milk of its own.

The Board of Health of the city makes our examinations free. Thorough bacterial examinations are made. This relieves the Commission of any cost for certification of milk, except such as may come from the work of physicians inspecting dairies. The milk sells at fifteen cents per quart.

In introducing Inspected Milk before Certified Milk was put on the market, and co-operating with the city health authorities, women's clubs and other organizations put us in the position of encouraging the sale of several different grades of milk at various prices. We are now, with the aid of the Health Board, attempting to establish a standard for Pasteurized Milk. I would like for some of the members to tell me what, in their opinion, should be our attitude in regard to the encouragement of various standards of milk. The great bulk of the milk sold in Minneapolis is Pasteurized Milk. Our relations with the City Health Department are most cordial, and they are heartily co-operating in the efforts to better the milk supply of Minneapolis.

REPORT OF JEFFERSON COUNTY MEDICAL MILK COMMISSION.

By Robert Nelson, M.D., Birmingham, Alabama.

I am glad of an opportunity to let you know just what we have done and are doing, and what our prospects are. A little less than two years ago our Milk Commission was formed, con-

sisting of our Committee on Health (a body of five medical men selected from the county society) and the municipal health officer, veterinarian, and bacteriologist. At that time three men of means were induced to back the theory of the production of Certified Milk. Thus we started off with considerable financial backing, and we have done good work. The dairies are all on a small scale, the herds averaging thirty-five or forty cows, all tuberculin tested. Our minimum bacterial count is 15,000. It ought to be lower, and we are going to bring it down. Since our organization, a little less than two years ago, another dairy has started which bids fair to do good work. The requirements of our Commission with respect to the production of Certified Milk are, I believe, in accord with the requirements of this Association. We require that the milk shall be cooled to 45° within an hour, have a maximum bacterial count of 15,000, and shall either be put on ice by the middle-man or delivered to a responsible person within twenty-four hours. As to the condition of the milk house, I think our requirements are about the same as those of other Medical Milk Commissions. We hope to do better work in the future. We have one defective Certified dairy which we are going to investigate, and see if they cannot be induced to live up to our requirements. We are doing all in our power to get as many farms as possible into the Certified class, and I think that, in the near future, we will be able to get more than our present two.

REPORT OF THE MILK COMMISSION OF THE CINCINNATI ACADEMY OF MEDICINE.

Otto P. Geier, M.D.
Cincinnati, Ohio.

I have come to believe, since the inception of the work in Cincinnati, that Certified Milk, *per se,* is limited in its value to the community because of the small amount used. When we know that, of the amount of milk consumed by the average community, only about one-half to one per cent of it is Certified Milk, we must realize that, if the tremendous amount of energy

that the members of local Milk Commissions put into this work is to count, we must enter into a broader campaign of education. In Cincinnati we have succeeded in that sense, we believe, because, upon going into the history of the Commission there, we find that it has meant—to state it in a few words—first, the establishment of a Medical Milk Commission in a city where the milk was the worst in the country, where the local Health Department was riddled with politics. Secondly, we introduced into the Legislature (in the face of the opposition of the Health Board of Cincinnati) a bill looking toward the production of pure milk. We had the bill passed, and later a non-partisan Board of Health was established. To-day we believe that our Health Board is as effective as one can be made, considering the short time they have been at work. We feel that the milk situation in Cincinnati has gone beyond our fondest hopes at the time we began this campaign.

As most of you know, we have not limited ourselves to the certification of milk, but also supervise the production of Inspected Milk. The introduction of Inspected Milk into the market has had a tremendous influence for good, and we feel that when you speak of the work of the Milk Commission of Cincinnati you must give it credit for having absolutely revolutionized not only the milk work of the city Health Department, but really all the public health work of the city.

We recently engaged in a campaign of education by means of a series of lantern-slide lectures, conducted under the authority of the Milk Commission, before mothers' clubs, women's clubs. Since January 1, thirty-one of these lectures have been held in schools, to which the public was invited.

We have utilized the dining-car service on railroads to promote the sale of Certified Milk. Many of the clubs and hotels in Cincinnati are also using it.

The resolution introduced and passed here this morning, looking toward the formation of a committee from this body to study the methods by which Medical Milk Commissions can be helpful to cities in raising the standards of milk supplies, is, I think, a very important one. If the work of that committee can be

drawn to the attention of Milk Commissions generally, throughout the country, I believe that many of the now moribund Commissions will be able to again go forward.

As Secretary of the Association, the difficulty I find with the average Commission which is inactive or which is not making much progress is that they do not realize their own power. I think it is absolutely within the scope of the Medical Milk Commission to become the monitor not only of the milk situation in a city, but eventually of the general health situation.

The Milk Commission of Cincinnati has done a great deal toward bringing the Academy of Medicine to the attention of the public. Many men in Cincinnati have told me that before the Milk Commission was organized they had never heard of the Academy of Medicine, and now when it comes forward with propaganda it meets with very prompt and hearty co-operation on the part of the city health organization. An illustration of what a Medical Milk Commission can do is exhibited by the statement of the President of a California Medical Society who, while on a visit to Cincinnati recently, stated to me: "The Milk Commission of our county is a real asset of our society; it is the biggest thing we have, and around it much of the activity of the whole society is built."

Dr. T. C. McCleave, Berkeley, California: "In the report of the Saint Louis Commission, reference was made to the lessened infant mortality due to the use of Certified Milk. We had a very interesting experience along that line in San Francisco. Formerly all foundlings were kept in the Foundling's Home, and the mortality rate among these infants was about sixty per cent. Then the plan was tried of abolishing the Home and boarding the foundlings out, and under that system the mortality decreased very materially. The exact figures are not in my mind. After this plan had been in operation for about a year, arrangements were made by which the foundlings were provided with Certified Milk, and within a year the mortality had dropped to less than three per cent. So that within three or four years, under the plan of boarding these infants out and supplying them with Certified Milk, the death

rate was reduced from sixty per cent to less than three per cent."

Dr. Otto P. Geier, Cincinnati, Ohio: "Each year as I listen to the presentation of annual reports and then to the discussion, I am impressed by the great diversity of methods employed in the certification of milk. That is not a reflection upon individual Commissions; they are doing the best they know how. Doctors are not particularly gifted with business sense or business methods; at least, they are not credited with them. You are all familiar, of course, with my long-wished-for field agent to represent this Association—a secretary or field agent who should be paid by the Association to go among the Commissions and clarify just such situations. I believe if we could get producers throughout the country to appreciate its value, they could afford to pay into the central agency sufficient money to put a man in the field to go into individual communities and stimulate the demand for Certified Milk,thoroughly organizing the Commission, and putting before the producers definite methods for advertising their product. He could be made to pay for himself in a very short time. It seems to me almost imperative that we get that sort of a central agency established, and I think we should make some effort this year to have the Federal Government support it, either through the Public Health and Marine Hospital Service or through the Agricultural Department, having them set aside one man who could be detailed from the Secretary's office to those Commissions which need help. It is going to take some time to educate a man along this line, but I think it is a good plan and should be pursued. In my opinion, a committee should be appointed to take up the problem of securing this aid from the Government, and I think it will lead to very good results."

The President: "I think Dr. Geier has brought up a very important point. He voices a sentiment that I have entertained for several years; that is, that the final solution of this problem is to get the Government to do this work, and I would be glad to see Dr. Geier's suggestion carried out."

Dr. Geier: "I move you, Mr. President, that a committee of three be appointed by the Chair to carry out the idea."

The motion was seconded and duly carried.

Dr. Louis C. Agar, Brooklyn, N. Y.: "A great many interesting questions have come up this morning, most of which, however, will be taken up in the discussions of the various papers to be read. There are three things that I wish to speak of now. First, the financial question. Dr. Geier has practically covered what I desire to say—that this work cannot be done properly and successfully without adequate financial support, and the producer, or rather the consumer, who is the one who eventually pays all the bills, must bear all the cost of producing Certified Milk. It should not be put upon a charity basis, so far as the production is concerned. It is imperative that the finances be sufficient to keep the Commission free from criticism and opposition. It must have a sinking fund for emergency use. We have such a fund in Brooklyn, and expect to keep it up. We charge each producer a certain amount per quart for certifying his product. I think every State should have a law designed to protect and encourage Milk Commissions; I suppose many of them have such a law. In New York we have a law which takes care of our Commissions. One other thing that I wish to mention is the relationship between the local Health Department and the Milk Commission. I have always felt very strongly that the Milk Commission should not be mixed up in any way with the work of the Health Department, and I still believe that is true in large cities. I presume that in the smaller cities the Health Department is in pretty close touch with the county society as well as individual physicians, but in large cities, where politics in the Health Department is a prominent factor, the question is a very serious one."

Dr. J. W. Van Derslice, Chicago, Illinois: "In the city of Chicago the Health Board employs ten inspectors, who are supposed to inspect dairy farms, but whenever there is an epi-

demic of any sort these men have to be called in to do inspection work in the city. During the past year the relations between the Health Department and our Commission have been most cordial. I wish to explain why the design on our cap was adopted. In Wisconsin and Illinois the cigar-makers' and printers' unions introduced and had passed a law which is a very beautiful one for the purposes of the Milk Commission. It was impossible to copyright anything such as the California Commission put on its labels. This design is used because it can be copyrighted and registered so that our title to it would hold good in any court, and we hoped that the constant use of this label would educate the public to the fact that this 'meaningless design' stands for Certified Milk. Practically all of the Certified Milk coming into Chicago is delivered to the consumer within twenty-four hours. There is one firm, however, of whose product this is not true. So far as the Chicago Medical Milk Commission was able to determine, from the writings of the best authorities on the subject, there is no particular advantage in the twenty-four-hour over the thirty-six-hour period, where the milk is handled as carefully as it is with respect to temperature. We have had our greatest trouble with the milk on the early morning delivery. The wagons start out between one and two o'clock in the morning, and the milk is not taken in from the back porch until six, seven, or eight o'clock, and we feel that the increase in the bacterial count, and the chemical changes that take place in the milk during those few hours, present a far more serious problem than a primary delay of twelve hours. We have sent out circulars, and have adopted the plan of placing in the cap a folded slip of paper containing directions for the care of the milk in the home. These are put in the caps from time to time, not every day."

The program of the morning session having been concluded, the President declared the meeting adjourned until 2:30 P. M.

SECOND SESSION.

Tuesday Afternoon, April 30, 1912.

The meeting was called to order at 2:30 o'clock, by the President, and the program proceeded with as follows:

A NEW VOLUMETRIC METHOD FOR THE DETERMINATION OF FAT IN MILK.

Thomas B. Stillman, Ph.D.[1]

The various methods of determining the percentage of fat in milk, volumetrically, require the use of either strong acid or alkali as components of the reagents used. The "Babcock"[2] method, which is most frequently used for the estimation of fat in milk in this country, requires equal volumes of milk and strong sulphuric acid.. The Leffmann-Beam method[3] uses strong sulphuric and hydrochloric acids with amyl alcohol, and the Gerber "sal"[4] method uses caustic potash in the "sal" solution as the quantitative reagent for the fat determination, while the "Adams"[5] and the "Warner-Schmid"[6] methods require experienced chemists for proper manipulation of chemicals and apparatus.. A process has long been sought that will determine the amount of fat in milk that will be expeditious, correct, simple, and free from the use of corrosive chemicals; and if this can be performed by one not a chemist, or any employee of a dairy, then milk inspection, before the milk is forwarded from the country to the cities, would be of the greatest possible service in the securing of a better milk supply.

In France considerable attention has been given lately to milk testing in the line of making it with non-corrosive chemicals and simplicity of manipulation. M. Albert Bruno, chief of the Central Laboratory of the Service for the Suppression of Frauds, Department of Agriculture, France, proposes the use of a new instrument for the determination of fat in milk, calling it the

[1] Research Chemist, Stevens Institute of Technology.
[2] Seventh Annual Report of the Agr. Expt. Stat. of University of Wisconsin, 1890.
[3] The Analyst, 1892, p. 80.
[4] Milch-Zeitung, 1906, No. 4.
[5] The Analyst, 1885, p. 46.
[6] Food Inspection and Analysis, A. E. Leach, p. 103.
Barthel, in "Methods used in the examination of Milk and Dairy Products," page 67, states that Gerber's method is in universal use except in North America, where the Babcock is principally used.

bi-butyrometre of M. Muloteau, and the use of an alkaline reagent instead of acid.

It is not necessary to describe this instrument, as manipulation with the "Babcock" bottles is easier; but the "Fouard" reagent used will prove of interest. This reagent is composed as follows:

10 grammes of KHO
50 c. c. Alcohol, 95%
15 c. c. Alcohol Amylic
25 c. c. Ammonia, pure, at 22° B.

100

This mixture contains no acid. In the place of the amylic alcohol, as given in the Fouard reagent, I would substitute Iso-butyl alcohol. Amylic alcohol has a very disagreeable, penetrating odor, whereas Iso-butyl alcohol has a pleasant, agreeable perfume, and its chemical properties, as required in the Fouard reagent, are similar to amylic alcohol.

Process of Manipulation.

Take 17.6 cubic centimeters of the milk, transfer to a Babcock milk-testing bottle, add 10 c. c. of modified Fouard reagent, and place the bottle in a water bath and *gradually* heat the water to a point just below boiling, and maintain this temperature about fifteen minutes, shaking the bottle slightly at intervals.

The color of the liquid becomes finally a deep red and the coagulated casein is dissolved; add warm water carefully until the fat reaches nearly to the upper mark of the graduated stem of the bottle. The fat arises in the tube in a clear, transparent yellow body and the amount is read off in per cent of the milk fat.

The space between 0 and 10 on the scale of the Babcock test-bottle is divided into fifty divisions, each five of which represent one per cent.

A series of comparative tests between the Babcock method and the method using the modified Fouard reagent indicate that the latter method gives a slightly higher result in fat than the former.

Concentrated sulphuric acid used in the Babcock must have a certain specific gravity. Farrington and Woll state: "It will be noticed that the sulphuric acid to be used in this test should contain ninety to ninety-two per cent of acid (H_2SO_4), . . . but successful tests cannot, as a rule, be made with acid weaker than eighty-nine per cent or stronger than ninety-five per cent. The strength of the acid is indicated to a certain extent by the color of the fat which separates in the neck of the test-bottle when the milk is tested."

If the directions given are carefully followed, the fat separated out will be of a golden yellow color. If the fat is light-colored or whitish, it generally indicates that the acid is too weak, and a dark colored fat, with a layer of black material beneath it, shows that the acid is too strong, provided that the temperature of milk and acid is about 70° F. With the modified Fouard reagent no such alteration of the fat in the milk is produced, every test giving it a clear yellow color.

The Fouard reagent can be prepared in large amounts, and since it keeps well, can be available for use at any time.

DISCUSSION.

Dr. Louis C. Ager, Brooklyn, N. Y.: "Do I understand that a centrifuge is not used in this test?"

Mr. H. E. Mortland, Saint Louis, Mo.: "It seems to me that, with this method, if a centrifuge is not used, some of the fat would be left sticking to the neck of the flask. Therefore, I should think it would be necessary to use a centrifuge to a certain extent."

Dr. George D. Haggard, Minneapolis, Minn.: "It seems to me that, since this method has been most carefully described and no mention made of centrifuging, it is not required. The agitation spoken of is doubtless sufficient. You will notice that the reagents are somewhat different from the ordinary, and I suppose that explains, to some extent, the result obtained. Under the modification that occurs from the use of these reagents, it is probable that none of the fat molecules remain sticking along the side of the tube."

RESEARCHES INTO THE BACTERIOLOGICAL CONTENTS OF MILK PREPARED AND KEPT IN THERMOS BOTTLES FOR INFANT FEEDING.

R. Hayes Davis, M.D.
Louisville, Ky.

As the thermos bottle is such an efficient means of maintaining temperatures for a number of hours, the manufacturers believed that it would be a great aid to mothers in feeding their infants. Mothers and nurses would be able to heat the milk before going to bed, and it would then remain warm and be ready for the baby's use at any time and thus save the trouble of heating it during the night. The company has accordingly recommended their bottle as a most useful aid to mothers. Such would be the case if milk bacteria did not play such an important role, but unfortunately milk is one of the best culture media for bacteria, and the slightest bacterial contamination will in a few hours multiply into millions of germs if temperature conditions are satisfactory.

Dr. Henry E. Tuley, after reading some of the advertisements, felt that nothing but harm could possibly come from any method that had for its object the keeping of milk at a warm temperature. He acordingly called the attention of the American Thermos Bottle Company that such a use of their bottle would necessarily increase infant mortality. The company had, however, some reports which are interesting. Dr. W. A. Evans, former health commissioner of Chicago, found that milk placed in a thermos bottle at 140° F. or above would after a few hours show a diminution of bacteria and would finally become sterile. They also had the results of examinations made by Dr. F. A. Tonny, director of the city laboratories of Chicago, which were given publicity in the Chicago Daily Tribune, under the date of September 28, 1911, and which are as follows: "If milk is placed in a thermos bottle at a temperature of 115° F., or below, the bacteria multiply very rapidly, and in a few hours the milk is unfit for babies' use. If the temperature is 140° F., or above,

the bacteria diminish, and within a few hours the milk is sterile." His conclusions were:

1. Putting the baby's milk into a thermos bottle is never justified unless the temperature of the milk is first taken.

2. If the temperature of the milk is under 135° F., it will be unfit for use in a few hours.

3. If it is 135° to 140° F., it can be kept in a thermos bottle with safety.

Mr. William B. Walker, president of the company, however, further states that, owing to a difference of opinion which seems to exist, he is now recommending that the milk be placed in a bottle at a temperature never above 50° F., and that boiling water be placed in another bottle. The low temperature would preserve the milk, and the boiling water would remain hot for some time, so that during the night when it became necessary to feed the baby the cold milk could be diluted with the warm water, thus raising the temperature to the proper point for the infant's stomach. This method is, of course, perfectly satisfactory from the standpoint of the bacterial counts. Mr. Walker suggested that Dr. Tuley conduct a series of experiments for the purpose of clearing this matter up once and for all, and he very kindly furnished some bottles for the purpose. At Dr. Tuley's request, I have made a series of experiments, and I believe that we have proved that for practical purposes the thermos bottle cannot be used for keeping milk warm without greatly increasing the number of bacteria.

I have made five series of counts with Certified Milk, all of which were found to contain 10,000 bacteria or less per c. c. The milks were placed in bottles at temperatures of 120°, 130°, 140°, 145°, 167°, and 212° of the Fahrenheit scale. Throughout these examinations the technique has been used which would be the only practical one for mothers. The bottles were carefully cleansed, rinsed with warm water, increasing the temperature until boiling water could be placed in them without danger of cracking. They were then rinsed with the boiling water once, and then more boiling water was allowed to remain in them for about five minutes. The milk was now brought to the proper

temperature and placed in the bottle at once. This proceeding was carried out at night, and the plates were made the next morning, after twelve hours had elapsed. You will note that I have used the term 100,000+. Many of these plates so described showed bacteria in such overwhelming numbers that counting was absolutely impossible without making further dilutions; and as 100,000 bacteria was sufficiently high to demonstrate the unfitness of such milk for infant feeding, I did not deem it necessary to make these higher dilutions for more accurate counts. I have tabulated my results as follows:

TEMP:	120°	130°	140°	145°	150°	167°	212°
1st Milk...	100,000+	28,000	10,100	100,000+	100,000+	100,000+	100,000+
2d Milk....	100,000+	100,000+	100,000+	100,000+	100,000+	100,000+	100,000+
3d Milk....	100,000+	100,000+	100,000+	27,000	100,000+	100,000+	100,000+
4th Milk...	100,000+	100,000+	100,000+	100,000+	100,000+	100,000+	100,000+
5th Milk...	100,000+	100,000+	100,000+	100,000+	100,000+	100,000+	100,000+

In most of the plates the 212° milk showed considerably fewer colonies than the others, although it was distinctly above 100,000 bacteria. In the lower temperatures, such as 120° and 130°, most of the plates were almost solid with bacteria.

These experiments would seem to demonstrate conclusively that the spores present in the milk are not destroyed by simply heating it to a high temperature, but will multiply very rapidly as soon as the temperature becomes sufficiently reduced for bacterial growth. This does not in any way conflict with the accepted view that pasteurizing the milk reduces the number of bacteria, for most bacteria are readily destroyed by these high temperatures, and the count would remain very low if the milk were kept at a low temperature. The trouble here lies in the fact that certain spores are not destroyed, or the bottle is perhaps not sterile, or a contamination of the milk may take place from many different sources in the handling by hands not skilled in bacteriological technique. Even then, as long as the temperature remains sufficiently high to be inhibitive to the growth of bacteria, there will not be any increase, or there may even be a diminution. But sooner or later the temperature will become reduced sufficiently for the most rapid bacterial growth, and then the bacteria which have resisted the heat will at once begin

to multiply by the millions in a very short time, owing to the favorable medium which contains them.

I then carried out several counts with market milks from three of our largest dealers, and these gave practically the same results, except that the control milks before heating gave much higher counts than the certified ones, all reaching 100,000 or over. It should be stated, however, that these milks were all bought from various stores, and were carried some distance without ice. These milks were placed in the thermos bottles at temperatures of 120°, 140°, 150°, 167°, and 212°. The results are given in the table below.

TEMP:	120°	140°	150°	167°	212°
Dealer No. 1.—1st Milk.....	100,000+	100,000+	100,000+	100,000+	100,000+
2d Milk.....	100,000+	100,000+	100,000+	100,000+	100,000+
Dealer No. 2.—1st Milk.....	100,000+	100,000+	100,000+	100,000+	100,000+
2d Milk.....	100,000+	100,000+	100,000+	100,000+	100,000+
Dealer No. 3.—1st Milk.....	100,000+	100,000+	100,000+	100,000+	100,000+
2d Milk.....	100,000+	100,000+	100,000+	100,000+	100,000+

Finally, I made an experiment with the sterilization of the thermos bottles which is of interest. The milks which were used in this test were all completely sterilized by subjecting them to live steam for twenty minutes in an Arnold sterilizer for three consecutive days. These were all shown to be sterile by appropriate bacteriological examination. The bottles were then treated by the boiling-water method described fully above. The milk was then placed in the bottle at 100° F. and allowed to remain for twelve hours, at which time the plates were all found to contain the usual large number of bacteria. This, of course, showed that the method of sterilization of the bottles in the reach of mothers would not be satisfactory at all.

If time had permitted, I should have determined for this paper whether the high counts were due more largely to undestroyed spores in the milk or to bacteria which were not destroyed in the sterilization of the thermos bottle; but probably both play an important part, and for practical purposes it makes little difference, as in either event the milk would become unfit for infants' use after a few hours.

In conclusion, we are justified in stating that any method

that would completely sterilize the milk and bottle and prevent any possible contamination from the outside would not be practical, and unless such a method could be carried out, bacteria are bound to increase very rapidly in the warm milk. Therefore, the only method available and practical for the mother is highly unsatisfactory and unsafe, and we feel that the use of the thermos bottle for keeping milk warm for infant feeding should be strongly condemned. The only safe method would be the one now recommended by the company, of keeping the milk cold and the water hot and diluting the milk just before use.

DISCUSSION.

Dr. Henry Enos Tuley, Louisville, Kentucky: "As stated, these experiments were undertaken at my request. I was surprised to find how many mothers were using these bottles to keep milk warm, and, having seen two babies rendered ill by the use of such milk, I tried to discourage the company advertising this method of warming milk."

Dr. Harris Moak, Brooklyn, New York: "I have been exceedingly interested in this paper, for it brings out a fact that is of the greatest importance; namely, that our supervision of the production and handling of Certified Milk ends when the bottle is set down at the door of the consumer. Our Commission has been anxious to hear every complaint that is made about Certified Milk, and to-day the dealers in our city are so in accord with us that whenever they receive a complaint from any customer against Certified Milk, it is promptly referred to our Commission for investigation. The investigation of the various complaints has been very interesting. In practically every instance, we have found that the same principle has been violated as shown by Dr. Davis's experiments. We have found that, while the milk is delivered at the home cold and in good condition, the custom prevails of using hot water in the modification of the milk, which is oftentimes followed by dire and disastrous results. Moreover, we have found that a great many physicians either do

not know or do not recognize the advantage of using cold boiled water in the modification of milk. Not only does this custom prevail in homes, but I can relate an instance of it in connection with a hospital investigation made last summer. We were asked, one Friday morning, to investigate the milk supply of a certain babies' hospital. We found that, from Monday morning to Friday morning, they had lost nine babies out of a total population of thirty-six. We found that, in spite of the attention of the attending physicians, and nurses trained in the very best hospitals in this country by men of international renown, they were using hot boiled water in the modification of milk. The bottles were prepared in sufficient quantity for twenty-four hours, placed in trays, and put in one side of an ice-box with a capacity of two or three hundred pounds of ice in the other side. Upon testing the temperature of the milk in the ice-box with thermometers, we found that it was in the neighborhood of 80° F. in the upper part and 60° F. in the lower part. That milk went to the mouths of the babes with such countless millions of bacteria that it would be a shame to enumerate them."

Dr. Chas. E. North, New York City: "Two years ago, the Thermos Bottle Company placed their advertising in the hands of a New York firm, one member of which is a friend of mine, and he consulted me with regard to their desire to advertise the bottles for the purpose of keeping milk warm for infant feeding. While I had carried out no experiments along this line, I urged him to advise the company that this would be a dangerous and an unwise thing to do; and he said he would endeavor to divert them from this policy. Therefore, I am somewhat surprised to learn that they have been advertising the bottles for this purpose."

Dr. Martin J. Synnott, Montclair, New Jersey: "I would like to ask Dr. Davis if all his tests were made after an incubation period of twelve hours, and, if so, why he selected that particular number of hours. It seems to me that if he had selected a shorter period of incubation, the results would have

been different; that ordinarily the milk would not be left in the bottle for longer than eight hours. The mother would put it into the bottle when she goes to bed, say at ten o'clock; the baby would get the first feeding at two o'clock, four hours later, and another at six o'clock, eight hours later. The eight and ten o'clock feedings would be from milk freshly prepared. It is possible that, at the time of the first feeding, the milk might be sterile, and yet after twelve hours show a large bacterial count."

Dr. I. A. Abt, Chicago, Illinois: "I am very much impressed by the remarks made by the gentleman from Brooklyn, but I cannot quite reconcile his clinical facts. The milk is contaminated by contaminated water, improperly boiled. This milk was given to the children in the hospital, and nine of them died. Now, I think we have a right to inquire further before accepting this statement. What time of the year was this? What was the cause of death? What was the pathological micro-organism that produced death? The mere fact that the milk contained 90,000 or 100,000 bacteria would not, to my mind, be the crucial point. They might be non-pathogenic bacteria and do no harm. On the other hand, if ten, or any small number of the typhoid bacilli, or the bacilli of dysentery, were contained in the milk, the result might be fatal. Without specific reference to the nature of the micro-organisms, I am inclined to believe that we need more light before we can accept the statement that these nine children died from the use of water that contained bacteria in modifying the milk. There are other elements that might enter into the cause of death in the summer-time; for instance, the heat itself might cause decomposition of the milk into toxic products, and I think we have a right to seek more information about these deaths before we can accept the statements made."

Dr. Chas. F. Tenney, Toledo, Ohio: "I have been very much interested in this paper, because it brings up the question of the pasteurization of milk in general. In every city the amount of Certified Milk sold is very small in comparison

to the total amount of milk used, and the fact that Certified Milk, heated to 212° F., placed in a sterilized thermos bottle and kept for twelve hours, will show a bacterial count of more than 100,000 per c. c., is appalling. Last summer I was told, by a chemist and bacteriologist for one of the milk concerns in Toledo, that pasteurization at 160° for twenty minutes would destroy the germs of typhoid fever, and I wondered what bacteria could resist 212° of heat and produce such a growth as this in twelve hours."

Dr. R. Hayes Davis, Louisville, Kentucky (Closing): "The reason for selecting a twelve-hour period is that that is the period usually employed by the mother. The results might be different if a six or eight-hour period was employed. I am inclined to believe, however, that if the milk were placed in the bottle at a temperature of from 140° to 145° F., judging from the overwhelming numbers of bacteria that were present after twelve hours, that at the end of eight hours the bacterial count would be at least sufficiently large to make the milk undesirable as food for a baby. As stated in the paper, the 212° milk showed a fewer number of bacteria than those at a lower temperature. Boiled milk, however, is never satisfactory, and we would hardly recommend that boiling milk be placed in these bottles. In reply to Dr. Tenney, I will say that, while bacteria themselves are easily destroyed by heat, spores are very resistant, and if the milk is subjected to only one heating, various bacteria will take the form of spores and will not be destroyed. A second heating, however, will destroy a large number of them, and a third will make the milk sterile. Many of the saprophytic bacteria resist high temperatures for a much longer period than the pathogenic ones do. As to sterilization of the bottles, the bottles were first thoroughly cleaned, then rinsed with increasing degrees of warm water to bring them to the point where they might be safely rinsed with boiling water, after which they were filled with boiling water and allowed to stand for a period of five minutes. The water was then poured out and the milk poured directly into the bottle. We did make some controls,

which proved that the bottles were not sterilized. We used milk that was absolutely sterile, as proved by bacteriological examination, which was put into the bottles, and within three hours it was found to contain 3,000 bacteria per c. c., proving conclusively that the bottles were not sterile. In the hands of the average mother, the boiling water process is the only practical means of sterilization; she cannot subject the milk to fractional sterilization, and, therefore, she cannot sterilize the bottle thoroughly, nor can she prevent contamination from various other sources. Therefore, taking all this into consideration, milk is almost certain to be rendered unfit for infant feeding by any method that may be used for keeping it warm."

ANNUAL TUBERCULIN TEST OF CERTIFIED HERDS.

Charles E. North, M.D.,
New York City.

In a report of the proceedings of the American Association of Medical Milk Commissions for the year 1910 there is a printed list of the Milk Commissions in the United States and Canada, which numbers sixty-one in all. As chairman of the special committee appointed by the Association at its annual meeting in 1911 for the purpose of securing the results of the annual tuberculin tests of all of the certified dairy herds operating under these Commissions, I have communicated by letter with the secretaries of all of the sixty-one Commissions whose addresses were above given. The first letter was sent out to the Commissions on November 16, 1911, and stated that the object of the committee's inquiry was "to have available for the members of the Medical Milk Commissions of this country accurate information as to the results of the tuberculin testing, which is done not only because of the value of this knowledge to the Medical Milk Commissions, as such, but because of the broader influence which this information will have on the general question of the suppression of bovine tuberculosis." With the letter

of November, 1911, was enclosed a report blank containing a statement of the questions to which replies were desired. On April 11, 1912, a second letter was mailed to all of those Commissions which had not yet replied, reminding them of the importance of the inquiry and urging them to reply before the annual meeting of the Association.

Of the total of sixty-one Commissions, replies have been received from thirty and no communication has been obtained from thirty-one. Of the thirty from whom replies were received, there were three which stated that no Certified Milk was being produced under their auspices, and one certifies to the same dairies which operate under the auspices of a neighboring Commission. Consequently, the committee is able to report the results of tuberculin testing from twenty-six Milk Commissions only. Below are tabulated the names of the Commissions and the dairies operated by each, and the results of their last annual tuberculin testing:

NAME OF COMMISSION.	NAME OF DAIRY.	DATE OF LAST ANNUAL TUBERCULIN TEST	NUMBER OF ANIMALS					REMARKS
			In Dairy Herd.	Giving Positive Reactions.	Slaughtered.	Showing Local Lesions.	Showing Gen'l Tuberculosis.	
Columbus, O.	Hartman Farm	11/11	470	.....	....	....	....	5 suspects.
	Wild Rose	11/12	60	.....	....	....	....	
Toledo, O.	H. H. Driggs	7/23/11	62	4	4	....	....	
Cleveland, O.	Walker-Gorden	11/7 11/18 12/22	139	4	4	No ta	obs. ken.	
New York	Walker-Gorden	4/21/12	398	21	....	..	....	Removed from farm.
Chicago	H. S. Hart	11/4/11	59	4	....	....	....	Removed from herd.
	Spencer Otis	9/1–10/21/11	95	3	1	1	....	2 isolated.
	Wakefield Farm	10/11	47	0	....	....	....	
	Brookhill Farm	6/11	43	0	....	....	....	
	Arthur Meeker	.....	156	6	....	....	....	
	Edgewood Farm	11/2/11	272	1	....	....	....	Isolated.
	Pleasant D. Farm	7/11	110	.....	....	....	....	Tested before purchase.
Alameda, Cal.	Timmis	5/22/10	175	2	....	....	....	
	Walnut Grove	1/10/10	114	8	....	....	....	
	Walnut Grove	6/10/10	98	4	....	....	....	
Dayton, O.	Gascho Dairy	11/28/11	87	3	2	....	....	

NAME OF COMMISSION.	NAME OF DAIRY.	DATE OF LAST ANNUAL TUBERCULIN TEST	NUMBER OF ANIMALS					REMARKS
			In Dairy Herd.	Giving Positive Reactions.	Slaughtered.	Showing Local Lesions.	Showing Gen'l Tuberculosis.	
Brooklyn, N. Y.....	Farm A.....	12/ 7/11	112	3	3	....	....	
	Farm P.....	6/ 3/11	26	.....	....	....	....	
	Farm C.....	3/18/12	46	0	....	....	....	
	Farm 3.....	11/17/11	46	.....	....	....	....	
	Farm 4.....	2/19/12	85	11	....	....	....	
	Farm 5.....	12/13/11	58	.....	....	....	....	
	Farm 6.....	1/18/12	51	.....	....	....	....	
	Farm 7.....	3/ 9/12	65	2	2	....	....	
	Farm 9.....	12/12/11	40	3	3	....	....	
Wheeling, W. Va....	L. A. Reynemm....	12/10	18	1	....	1	....	$1,000 Bull which had been on fair circuit for four months.
	L. A. Reynemm....	1/11	118	.....	....	....	....	
	L. A. Reynemm....	10/11	13	.....	....	....	....	
Erie, Pa.....	Watson.....	Spring 1910	24	4	4	3	1	Three sold for meat.
	Watson.....	10/11	22	.....	....	....	....	
Union Co., N.J., No.3	The Noe Farm(Inc.)	6/26, 7/8/11	150	5	5	5	....	All additions to herd isolated until tested.
Boston, Mass.....	The Warelands.....	2/25/11	?50±	1	....	....	....	Cow disposed of.
	Mass. Agri. College.	2/10/11	?	.....	....	....	....	
	Cherry Hill Farm...	2/ 1/11	?	12	....	....	....	12 disposed of.
	Middle Brook.....	2/11	80	.....	....	....	....	

NAME OF COMMISSION.	NAME OF DAIRY.	DATE OF LAST ANNUAL TUBERCULIN TEST	NUMBER OF ANIMALS					REMARKS
			In Dairy Herd.	Giving Positive Reactions.	Slaughtered.	Showing Local Lesions.	Showing Gen'l Tuberculosis.	
Cincinnati, O.....	Butterworth (Insp.)	10/ 4, 5/11	47	.....	.....	.....	.....	
	Lebanon (Cert.)....	9/15, 6/11	10	1	?	?	?	
	" "	9/21, 2/11	131	3	3*	2	....	4 suspects; *1—no lesion.
	" "	9/22, 3/11	10	.....	.....	.....	.....	
	" "	10/ 6, 7/11	14	.....	.....	.....	.....	
	" "	10/13, 4/11	13	.....	.....	.....	.....	
	" "	11/ 6, 7/11	40	1	1	1	....	2 suspects, 4 excluded.
	" "	11/ 8, 9/11	7	.....	.....	.....	.....	2 excluded.
	Oakhurst (Insp.)...	10/11, 2/11	49	.....	.....	.....	.....	
	Opekasit (Cer. & Ins.)	9/12, 3/11	4	.....	.....	.....	.....	
	" "	9/26, 7/11	7	1	1*			1 excluded; * no lesions.
	" "	10/ 8/11	68	.....	.....	.....	.....	1 suspect; 7 excluded.
	" "	10/16, 7/11	7	.....	.....	.....	.....	2 excluded.
	Valley View (Ins.)..	8/14, 5/11	5	.....	.....	.....	.....	
	" " "	9/15, 6/11	5	.....	.....	.....	.....	
	" " "	9/22, 3/11	14	.....	.....	.....	.....	
	" " "	9/25, 6/11	82	6	6	6	1?	
	" " "	9/27, 8/11	56	2	3	3	....	1 suspect.
	" " "	10/ 6, 7/11	21	.....	.....	.....	.....	
	" " "	10/18, 9/11	34	.....	.....	.....	.....	1 suspect; 1 excluded.
	" " "	11/ 8, 9/11	21	2	4	....	....	2 suspects.
	Wayne Farm (Ins.).	10/27, 8/11	9	.....	.....	.....	.....	1 suspect.
	" " "	10/ 2, 3/11	59	.....	.....	.....	.....	1 suspect.

NAME OF COMMISSION.	NAME OF DAIRY.	DATE OF LAST ANNUAL TUBERCULIN TEST	NUMBER OF ANIMALS					REMARKS
			In Dairy Herd.	Giving Positive Reactions.	Slaughtered.	Showing Local Lesions.	Showing Gen'l Tuberculosis.	
Worcester, Mass....	Elys-Elym Farm....	6/20/11	31	2	2	....	....	1 cow showed nothing; another showed 3 nails in stomach. Additions to herd tested before admission.
	Smith P. Burton....	4/11	23	3	?	?	?	
Hudson Co., N. J...	Swain Bros.....	12/10/11	8	1	....	1	....	Reactor removed from herd. Additions to herd tested before admission.
	J. S. Freylingshuysen	7/29, 30/11	74	3	3	3	....	
Elizabeth, N. J.....	" "	7/29, 30/11	74	3	3	3	....	
Essex Co., N. J.....	Fairfield Dairy Co. (inc.).....	1911	763	3	....	....	....	1 suspect; animals sold in open market.
Milwaukee, Wis.....	Edgewood Farms...	10/31/11	270	2	2	2	....	1 suspect.
Philadelphia, Pa....	H. H. Jeffries.....	10/30, 1/11	47	5	5	3	2	
	Wawa Dairy Farms.	11/13–21/11	180	3	3	2	1	
	Willowbrook Dairy Farm.....	12/11-16/11	133	.....	....	....	....	
Dutchess Co., N. Y..	Ulsterdorp Farms...	12/27, 8/11	69	.....	....	....	....	
Malden, Mass.....	Sedyard Farm.....	11/25/11	39	.....	....	....	....	
New York Co.....	Twenty herds.....	1911	1495	91	....	....	....	No report of disposition.

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			In Dairy Herd.	Giving Positive Reactions.	Slaughtered.	Showing Local Lesions.	Showing Gen'l Tuberculosis.	
Toronto, Can.....	Erindale.....	1/12	127	1 Sus.	....	....	....	
	Manor Farm.....	12/11	48	7	....	....	....	
	Detonia Park Farm.	1/11	78	.....	....	....	....	
Louisville, Ky.....	No. 1.....	6/11	80	.....	1	....	....	Tuberculosis mesenteric glands.
	No. 2.....	6/11	60	1	....	....	....	
	No. 3.....	6/11	40	.....	....	....	....	
	No. 4.....	6/11	30	.....	....	....	....	
	No. 5.....	6/11	12	1	1	....	....	
	No. 6.....	6/11	45	.....	....	....	....	
	No. 7.....	1/ 1/12	50	.....	....	....	....	
Pittsburgh, Pa.....	Dairy C.....	1/ 9/11	32	3	....	....	....	Removed from farm.
	Dairy B.....	1/1–11/12	50	32	....	....	....	
	Dairy A.....	1/1–11/12	35	.....	....	....	....	
Rochester, N. Y.....	W. P. Schanck.....	9/10	36	1	1	1	....	
	W. E. Dana.....	1/11	46	1	1	....	....	
	W. E. Tuttle.....	5/ 3/11	33	1	1	....	....	
	H. E. Whitmore....	4, 8, 10/11	36	9	11	6	3	
	Markham & Puffer Co.....	10/17/11	70	19	1	....	....	4 suspects isolated and to be tested again. Other 3 will be slaughtered; 1 susp. will be retested in 3 months; now in quarantine.

NAME OF COMMISSION.	NAME OF DAIRY.	DATE OF LAST ANNUAL TUBERCULIN TEST	NUMBER OF ANIMALS				REMARKS
			In Dairy Herd.	Giving Positive Reactions.	Slaughtered.	Showing Local Lesions.	Showing Gen'l Tuberculosis.	
Detroit, Mich.	Church Quarrie	12/30, 1/12	80	13	10	10	....	All passed for food except one.
	Detroit Cream Co.	2/3, 4/12	87	3	3	2	1	
Grand Rapids, Mich.	Hall Bros.	1911	38	.....	....	....	....	
Albany Co. Med. Soc.	C. O. Stevens	1911	43	7	Iso.	....	....	
San Francisco, Cal.	H. R. Timm	11/7/11	285	3 Susp.	....	....	....	
	Sleepy Hollow	1/24/12	188	5 (4 Sus.)	....	....	....	
	Hutton Bros.	11/7/12	88	.....	....	....	....	
Schenectady Co.	Gold Seal Dairy Co.	4/27/12	14	.....	....	....	....	

Summarizing those Commissions which made a complete report, it appears that during the past year there have been 7,974 dairy cows tested, of which 319 reacted. Your committee is unable to make a report regarding the slaughtering of these animals or other method of their disposal. Neither is it able to report concerning the nature of the tubercular lesions in these animals, because the information concerning these things is too meager. Last year a similar inquiry was conducted by a special committee of the Certified Milk Producers' Association, in which the chairman of the committee was the same as the chairman of the special committee making this present report. A total of fifty-four farms reported the results of their tests, compared with eighty-seven farms in the report rendered herewith. A comparison of the results is given in the table below:

Inquiry	*Dairy Farms*	*Total Tested*	*Reactors*
1911	54	6,560	192
1912	86	7,974	319

These results indicate that in the inquiry of last year the percentage of reactors was about 3%, while in the inquiry of this year the percentage of reactors is about 4%.

It would be a mistake to consider the report of this special committee simply in the light of such information as it may show on the subject of the results of the annual tuberculin test, since these tests bear not only an important relation to the welfare of the dairies themselves, but bear a relation to the welfare of the entire work of the American Association of Medical Milk Commissions and to the future success of Certified Milk.

There are certain recommendations which your committee desires to make, particularly because of the position in which the Association of Medical Milk Commissions finds itself with relation to the other movements which are now taking place in this country with regard to the improvement of milk supplies.

No one can fail to recognize that great changes are taking place. Among these, none is of greater moment than the growth of milk pasteurization. The leading authorities in this country have many of them signified their approval of the pasteurization

of milk as a necessary measure for the protection of the consumer against bovine tuberculosis on the ground that such protection cannot be secured in any other way. This position has not been limited to market milk, but Certified Milk has also been included. Consequently, the Certified Milk producer and the Medical Milk Commissions cannot afford to dodge this question, but must do their utmost to firmly establish public confidence in Certified Milk as such, if the product is to maintain the position which it has heretofore occupied.

Nothing will lend stronger support to public confidence in the product than the evidence of the freedom of certified dairy herds from bovine tuberculosis.

Your committee, therefore, makes the following recommendations:

(1) That each dairy cow in each of the certified herds be labeled or tagged with a number or mark which will permanently identify the individual dairy cow.

(2) That each cow in the herd be registered in a herd book, and that such register be accurately kept so that her entrance and departure from the herd and her tuberculin testing can be identified with her.

(3) That a copy of this herd record be kept in the hands of the veterinarian of the Medical Milk Commission under which the dairy farm is operating, and that the veterinarian be made responsible for the accuracy of this record.

(4) That the dates of the annual tuberculin test be definitely arranged by the Medical Milk Commission, and that all of the results of such tests be recorded by the veterinarian and be regularly reported to the secretary of the Medical Milk Commission issuing this certificate.

(5) That the results of all tuberculin tests be kept on file by each Medical Milk Commission, and that a copy of all such tests be sent to such committee or officer of the Association of Medical Milk Commissions as shall be designated by the Association.

(6) That the Association of Medical Milk Commissions establish a permanent committee or officer whose duty it shall be to receive all of the annual, semi-annual, and other official

tuberculin tests which are made, and to keep copies of the same on file and to compile an annual report and tabulation of the same.

(7) That this committee or officer shall regularly present an annual report of his compilation of these tuberculin tests and that the records of the same shall be kept on file by him and shall be open to the members of the American Association of Medical Milk Commissions.

(8) That one of the conditions of membership in the Association of Medical Milk Commissions and one of the conditions of certification of dairy farms shall be that they subscribe to the conditions indicated in the above recommendations.

DISCUSSION.

Dr. Henry L. Coit, Newark, New Jersey: "I cannot too strongly commend Dr. North's work in preparing the statistics which he has presented to us. There is nothing he has suggested that is not fundamental—is not necessary. I should like to offer a motion that the recommendations of Dr. North be adopted by this Association."

Dr. J. W. Van Derslice: "I would like to ask Dr. North how many Commissions are using Government veterinarians for their examinations.. The Chicago Medical Society advocates using the veterinarian of the United States Department of Agriculture exclusively, but as quite a few of our firms sell many cows, and the Government, as you know, will not give an individual card for each cow, this is an objection to find with the plan. There could be no more cordial relations than exist between the Chicago Medical Society and the Department of Agriculture. They have done practically everything we have asked them to do, but it seems to be impossible for us to get the veterinarian to make duplicate copies of his reports."

Dr. Ben Carlos Frazier, Louisville, Kentucky: "Almost all of our cows in Louisville have been tested by the Govern-

ment veterinarian. Last year, at the annual testing, all of the tests were made by Government veterinarians, and our Commission was furnished a duplicate copy of the report on every cow in the herds at that time. We have had, to some extent, the same trouble that Dr. Van Derslice has had in getting duplicate reports until we forbid our dairymen from using cows of which he had no report. The live stock commissioner has made it a point to see that these duplicates are furnished us."

Dr. T. C. McCleave, Berkeley, California: "In testing a group of cattle from any given source, with a view of admitting them to one of our certified herds, we have a rule in California to the effect that if the group of cattle contains reactors to the tuberculin test to the extent of ten per cent of the total number, the entire group is rejected. For instance, if one of our dairymen proposes to buy a group of one hundred cows from a given source, and eleven of those cows prove to be reactors, the entire group of one hundred cows is rejected. We also require that the herds shall be tested every six months. This requirement is based upon much the same reasoning as the ten per cent rule. We feel that if, by any chance, any infected cattle get into our herds, and we let them go too long, it will certainly result in the infection of a considerable number of cows; whereas, by testing every six months, we will catch those that are infected, and to that extent prevent further contamination of the herd."

Dr. Henry Enos Tuley, Louisville: "I believe the matter of obtaining duplicate reports is largely a question of personality, depending to a large extent upon the man we have to deal with. We had a department veterinarian here to make these tests for us, and he employed a card index system, each card containing the profile of a cow's head, upon which was indicated the head markings of each cow, which were water-colored or colored with crayon. While it meant a considerable amount of labor, he did it very cheerfully."

In answer to a question by Dr. Van Derslice, Dr. Frazier stated that the live stock commissioner required that the examining veterinarian furnish duplicate reports of each cow tested.

Dr. Chas. E. North, New York City (Closing): "In making these recommendations, I want to be understood. I think that this Association should adopt standard methods of tuberculin testing and keeping records of same, so that every Commission would do the same thing in a routine fashion. Every cow should be registered, so far as its individuality is concerned, and thus do away with any chance of the superintendent buying or selling without the knowledge of the veterinarian. If you have a veterinarian, from the Government or otherwise, who does not keep good records, he is not a good veterinarian. He should be a good enough bookkeeper to give you accurate information. If you don't get accurate information, you never know where you stand on this question. You would be surprised to know the amount of correspondence I have had in my efforts to get information from these Commissions. This chart embraces only twenty-six Commissions out of sixty, and yet to get information from these twenty-six was a very difficult matter, as the secretaries with whom I corresponded told me they had no figures and had to spend considerable time and labor to get them. It seems to me that the secretary of each Commission should be impressed with the fact that it is his duty to see that the veterinarian keeps a record of every cow that is tuberculin-tested. It is only by that means that we can have an absolute guarantee that all of the cows have been tested. I do not want to be put in a false position. I am the strongest possible advocate of Certified Milk and tuberculin testing of herds; I am simply anxious to see something done to standardize the work so that everyone will do it in the best way possible."

Upon putting the motion made by Dr. Henry L. Coit, it was unanimously carried.

THE RELATION OF BOVINE TO HUMAN TUBERCULOSIS AND ITS PATHOGENICITY FOR MAN.

Mazÿck P. Ravenel, M.D.
(Director Wisconsin State Hygienic Laboratory.)
Madison, Wisconsin.

There is never a year passes that something does not come up which illustrates the necessity of hammering this subject into the profession. I am something like the old preacher who kept on preaching the same sermon, time after time, until finally one of the deacons of the church went to him and said, "We are getting very tired of hearing that sermon you preached last Sunday." "What was it about?" asked the preacher. "It was on 'Repentance,'" replied the deacon. "Well," said the preacher, "have any of you repented?" "I don't know that they have," answered the deacon. "Then," retorted the preacher, "I am going to keep on preaching it until some of you have repented."

In Illinois a Commission, appointed by a jack-pot Legislature to investigate this subject, brought in a report that has done an enormous amount of harm. In the State of Kentucky a bill was introduced into the last Legislature which, if it had passed, would have nullified every effort for the betterment of the milk supply in that State. A short time ago a professor of surgery in one of the most noted schools in Chicago wrote an address on tuberculosis, in which he said that the question whether or not bovine tuberculosis was transmissible to man had not been decided, and then went on to show that he had tested the question whether or not these glands were tuberculous by the injection of rabbits. I could go on giving you instance after instance of this kind. Just the other day, Dr. Koplik, of New York City, went down to the Johns Hopkins University and made the statement that the death rate from bovine tuberculosis in children in New York was less than one-tenth of one per cent.

I want to review, for one minute, the work of Dr. Park, of

New York, and I want to lay particular stress upon this because he comes from a hot-bed of unbelievers. Further than that, no better work has ever been done in the world than that which has been done by Dr. Park. He has made an enormous number of investigations. No doubt many of you have read his last paper, which I think was published in the December number of the Journal of Medical Research. I simply wish to quote a few of his figures, which, to me, are particularly striking. In reviewing his work he comes to the general conclusion that, in the various hospitals of New York, from six and three-quarters to ten per cent of the fatal cases of tuberculosis in children are of the bovine type. Generally speaking, he says that in ten per cent of children who die from tuberculosis at all, the disease is of the bovine type. He adds that three hundred children die in the city of New York every year from bovine infection, and he has no reason to believe that other large cities of this country are not similarly situated in this respect. How any one can disregard such figures, I cannot understand. Dr. Park's statistics in connection with the Foundling Hospital are especially striking. He says that, of nine children who died of tuberculosis in this institution, five showed bovine, and four human, infection—about sixty per cent.

Summarizing Dr. Park's statistics, as well as those of other observers of this country, we find that, of 787 adults examined, 777 showed human infection and 10 bovine infection; in children from 5 to 15 years of age, of 153 cases examined, 36 showed bovine and 177 human infection; in children from birth to 5 years of age, of 280 cases examined, 65 showed bovine and 216 human infection. Taking these figures as they stand, I must confess that I do not see how any one can deny, or belittle in any way, shape, or form, the danger of bovine tuberculosis in children.

The English Royal Commission, which has been working since 1901, made its final report in August, 1911, from which I quote as follows:

Final Report of the Royal Commission, appointed to inquire into the Relations of "Human and Animal Tuberculosis." Part 1, page 13, paragraph 18.

"Of the total of one hundred and eight cases of human tuberculosis investigated, eighty-four yielded human tubercle bacilli only, nineteen yielded bovine tubercle bacilli only, and five both bovine and human tubercle bacilli. Although the bovine tubercle bacillus may, as it appears, be solely responsible for certain cases of pulmonary tuberculosis (consumption); and though it may be present with the human tubercle bacillus in the bronchial glands, it is evident from the data recorded that the majority of cases in which the bovine tubercle bacillus is the infective agent in the human being are cases of alimentary tuberculosis. Such are cases of cervical gland and primary abdominal tuberculosis. In the latter class of cases at least the tubercle bacillus has unquestionably been swallowed. Received in this way, the tubercle bacillus, whether human or bovine, may pass through the pharyngeal or buccal mucous membrane and infect the cervical glands, or, getting into the small intestine, it may produce several different lesions, such as ulceration of the gut, tuberculosis of the mesenteric glands attached, and of the peritoneal covering. The percentage of these cases of alimentary tuberculosis due to the bovine tubercle bacillus is very large. Taking both classes of cases (cervical gland and abdominal) together, numbering thirty-eight, there are seventeen in which the bovine bacillus alone was found, nineteen in which the human bacillus alone was found, and two in which both were found. Taking the primary abdominal cases alone, it is seen that in sixteen out of twenty-nine the bovine bacillus was found; in fourteen of these it was the sole infective agent present."

Page 40, paragraph 77.

"Meanwhile, we, in view of the evidence adduced by us, regard ourselves as called upon to pronounce on administrative measures required in the present for obtaining security against transmission of bovine tubercle bacilli by means of food. In

the interests, therefore, of infants and children, the members of the population whom we have proved to be especially endangered, and for the reasonable safeguarding of public health generally, we would urge that existing regulations and supervision of milk production and meat preparation be not relaxed; that, on the contrary, Government should cause to be enforced throughout the kingdom food regulations planned to afford better security against the infection of human beings through the medium of articles of diet derived from tuberculous animals.

"More particularly we would urge action in this sense in order to avert or minimize the present danger arising from the consumption of infected milk. And in this connection it may be convenient for us to repeat certain facts observed by us in reference to the conditions tending to the elimination by the cow of bovine tubercle bacilli in her milk; facts, in our opinion, of such importance that they formed the subject of our Third Interim Report.

"Bovine tubercle bacilli are apt to be abundantly present in milk as sold to the public when there is tuberculous disease of the udder of the cow from which it was obtained. This fact is, we believe, generally recognized though not adequately guarded against. But these bacilli may also be present in the milk of tuberculous cows presenting no evidence whatever of disease of the udder, even when examined post-mortem. Further, the milk of tuberculous cows not containing bacilli as it leaves the udder may, and frequently does, become infective by being contaminated with the fæces or uterine discharges of such diseased animal. We are convinced that measures for securing the prevention of ingestion of living bovine tubercle bacilli with milk would greatly reduce the number of cases of abdominal and cervical gland tuberculosis in children, and that such measures should include the exclusion from the food supply of the milk of the recognizably tuberculous cow, irrespective of the site of the disease, whether in the udder or in the internal organs."

I can only say that these sentiments and these regulations should be indorsed by every one who is interested in preserving

human life from bovine tuberculosis, and I hope this Association will stand, with respect to the principles laid down in this report, as it has always stood on matters pertaining to the public welfare.

DISCUSSION.

Dr. Henry L. Coit, Newark, New Jersey: "We cannot emphasize too strongly what Dr. Ravenel has said concerning this question. I have in my pocket a memorandum, culled from Dr. Park's last report, which I have been trying to fix in my memory. It reads: 'Taking all cases of tuberculosis in children which result in death, ten per cent are bovine and are due to milk; taking all cases of tuberculosis occurring in children, including non-fatal cases, such as glands, joints, bones, etc., from twenty to thirty per cent are bovine and are due to milk.'"

Dr. John R. Williams, Rochester, New York: "I do not think we have any way of accurately determining the prevalence of bovine tuberculosis, simply because these cases are usually of the non-fatal type, and we have no means of ascertaining the identity of the infection in the living child. Last summer, in the Infants' Hospital in Rochester, I examined thirty-three children admitted to the hospital for bowel disturbances, with no suggestion of tuberculosis, and ten of these cases reacted to the Von Pirquet test. Eight of these ten children had been fed on ordinary market milk. While there was no way of determining the identity of the infection, this to me is very suggestive that there is much greater danger in feeding children market milk than we now comprehend."

Dr. Louis C. Ager, Brooklyn, New York: "The question of the relation of bovine to human tuberculosis is still very much in the dark. I do not think Dr. Coit was correct in quoting Dr. Park to the effect that so large a percentage of cases were due to bovine infection and, therefore, due to milk. That does not necessarily follow. The organism may be contracted through other sources of food supply. In the Brook-

lyn Home for Consumptives, where we have a department for children, it has been demonstrated that more than one half of the children of tuberculous parents will react to the Von Pirquet test by the time they are ten years old. So it would appear that this test is not of very great value. While it may be true that in ten per cent of the children who die of tuberculosis the infection is of the bovine type, we must remember that the number of children who die of tuberculosis form only a very small percentage of the total number of children infected. While we have a large number of infections in children, most of the deaths occur in adult life."

Dr. M. P. Ravenel, Madison, Wisconsin: "I can only confirm what Dr. Coit has said, and state my own position on that question. I have never tried, in my arguments to protect people against bovine tuberculosis, to lay stress upon those cases that are detected in operating, such as hip-joint disease, hunch-back, tuberculous glands, which get well, because we had only a small number of such cases. However, Dr. Park, in his last paper, lays great stress upon the fact that many cases that lead to prolonged suffering and permanent deformity are due to the bovine bacillus. I have purposely only considered those cases in which death occurred, where we can obtain absolute proof of the type of infection. In regard to children obtaining the infection from sources other than milk, I cannot conceive how a baby of less than two years can be infected by any other means. We know that tuberculosis is not a disease of the muscles. Of course, we do see it in the muscles, but as a rule the muscles are free from the disease. It is a disease of the internal organs and glands, and, so far as I know, the only way for a child under two years of age to get the bovine bacillus is by drinking milk. This point is clearly brought out in the report of the English Royal Commission. While cattle unquestionably cough out the germs just as a man does, still children of this age hardly attend cattle, and I think the conclusion is absolutely justified that in nine hundred and ninety-nine thou-

sand nine hundred and ninety-nine cases out of a million, the infection is obtained by drinking milk."

Dr. I. A. Abt, Chicago, Illinois: "I think we ought not to allow to pass unchallenged the remark that a child can only be infected through the alimentary canal. I am willing to concede that a certain number are infected through the alimentary canal, but one who has seen the different forms of tuberculosis in childhood is impressed by the many ways in which the disease manifests itself clinically. In Austria, Ghou believes that ninety per cent of cases of tuberculosis were primarily of the bronchial glands, and secondarily of the respiratory system. It is true, too, that the tuberculosis one sees on the continent is largely general tuberculosis. When one goes into England, in the large cities, one sees a large number of cases of bone tuberculosis. In this country we have little bone tuberculosis and a relatively large proportion of respiratory and general tuberculosis. It seems to me that we have a right to conclude, from the clinical manifestations of the disease, that the mode of infection varies, especially in view of the fact that autopsies which have been made in a large number of cases have shown that, in many instances, the disease is primarily of the bronchial glands and secondarily of the respiratory system."

Dr. M. P. Ravenel, Madison, Wisconsin (Closing): "In reply to Dr. Abt, I will say that no man on earth can tell a respiratory infection from an intestinal infection. I showed, at the New York Academy of Medicine, specimens from monkeys fed with my own hands which any man would have sworn were specimens of respiratory tuberculosis, but such was not the fact. I have said for a long time that, paradoxical as it may seem, the place to look for primary intestinal tuberculosis is not in the gut, but in the lung; and we have proven that. We repeated the work of an English observer and inoculated something like sixty-five guinea pigs, doing a laparotomy and injecting the tubercle bacilli directly into the stomach, and in four hours time we found tubercle bacilli in

the lungs of the guinea pigs. Robinovitch and a co-worker went farther and did more complete work. They took swine, made a fistula into the stomach, and after the animal was well nourished through the fistula, resected the œsophagus and sewed up both ends, and then gave a single injection of tubercle bacilli, and they were found practically throughout the body in from twenty to twenty-four hours. The clinicians have misled us for years and years. There is absolutely no way of telling from whence the infection started. Any one who has studied tuberculosis in children knows that, if there is one peculiarity of the disease, it is to become rapidly generalized. The only way the clinicians have of telling where the infection began primarily is by the age of the lesion; they tell us to look and see which has advanced the farthest histologically. The disease does not affect all organs and glands alike; it will progress more rapidly in one than in another. For instance, genito-urinary tuberculosis will progress faster in a given time than in any other part of the body. I do not deny respiratory tuberculosis. I have always said that, as far as present proof goes, the majority of cases are respiratory. I do not believe that, but I cannot prove anything else. But, when it comes to telling where the disease started by the apparent age of the lesion, I do not agree with you at all; it does not progress in different glands in the same way. Every one of your clinical observations is based on the age of the lesion, and it is not worth a snap of the fingers."

SOME BACTERIOLOGICAL PROBLEMS IN CERTIFIED MILK PRODUCTION.

P. G. Heinemann, University of Chicago.

The maximum number of bacteria per cubic centimeter in Certified Milk permitted by Medical Milk Commissions is usually 10,000. The conditions imposed upon dairies are calculated chiefly to prevent bacteria from gaining access to the milk during milking, cooling, and bottling. There is danger of concentrating attention on the reduction of numbers and neglecting other

factors which insure the safety of Certified Milk. Considerable rivalry exists between dairies in producing milk of low bacterial content—a rivalry sometimes encouraged by Milk Commissions, who publish the results of bacterial examinations. The burden of the work rests on the sanitary inspector of dairies. The inspector frequently is not a trained bacteriologist, and consequently some points may escape attention. A cobweb in the corner of the ceiling will be criticized severely, while the presence of germ carriers will pass unnoted.

The object of low bacterial counts is not so much the actual reduction of usually harmless numbers of bacteria, as the coincident lessening of chances of infection with pathogenic germs. This fact is easily lost sight of, since public statements of the purity of milk announce nothing but the bacterial counts. Milk from a dairy with efficient medical control may contain higher numbers than milk from a dairy, where equipment is such as to produce milk with low bacterial counts. In this case the former milk is safer, even though containing more bacteria.

It seems to me that the time is ripe for a revision of contracts entered into between Medical Milk Commissions and dairies, and the creation of a permanent board of control of the actions of Milk Commissions. The terms of some contracts are too exacting in certain respects. Consequently, expensive equipment with investment of large sums of money is encouraged. It has been demonstrated that milk, equal to Certified Milk as far as bacterial counts are concerned, can be produced in inexpensive barns. Under prevailing conditions of inspection, Certified Milk cannot be produced in these barns. Among the many unreasonable demands, which appear in contracts, the following ones may serve as illustrations: "The barns must be built according to the most approved style of architecture," "Farm animals must be kept at least four hundred feet from the barns." Comment on these points is not necessary. The food of cows has received too much attention. It has been shown that cows of a certain breed will produce milk of nearly the same composition, no matter what the food, as long as it is clean and wholesome. In a recent publication of the Wisconsin Agricultural Experiment

Station, the result of four years' experiments is reported. It is shown here that the usual method of measuring rations for dairy cows by chemical standards is inefficient, that peculiar properties of foods have physiological influences independent of chemical composition. A similar principle applies to attempts at increase of yield of milk by giving certain kinds of food. The quantity and quality of milk is characteristic of the breed. It is, therefore, not appropriate to prescribe the kind of food to be given and to exclude, for instance, dry brewer's and distiller's grains. These contain much valuable nutritive material. The direct influence of certain kinds of foods upon the taste and healthfulness of milk has not been sufficiently investigated. Many false notions in this respect are still in vogue. The only reason why food should not be given before and during milking is the danger of raising dust.

The water supply is given rigorous investigation by Milk Commissions. We naturally do not wish to have milk cows drink sewage or swamp water, but there is no reason for permitting only water from deep wells.

Aëration is sometimes demanded. It is true that odors, which are readily absorbed by milk, can be partially removed by aëration. However, this should not be necessary. Odors need not exist in clean barns, and aëration increases the chances of bacterial contamination by contact with the air.

Milk should not be strained more than once to remove coarse particles. Violent agitation breaks up clumps of bacteria and the colony count increases. Pouring milk upon a strainer, on which dirt has accumulated, tends to divide the dirt into parts, which can pass through the strainer. A slanting strainer with a solid part at the lower end to catch dirt particles does away with this objection to a large extent.

Cream is produced almost exclusively by means of separators. Separator cream contains fewer bacteria than the milk from which it has been separated. The maximum number of bacteria in cream can therefore be made the same as for milk, and not 25,000, as is customary.

The examination of Certified Milk is often supposed to de-

termine the total number of bacteria, the presence of pus cells, streptococci, and pathogenic germs, and it has even been suggested to make routine tests for tubercle bacilli. Experienced bacteriologists are content with the count obtained according to the method outlined by the Committee on Standard Methods of Milk Examination of the American Public Health Association. Although the methods recommended at present are not final, they should be followed to obtain comparable results. Species determination is considered of little value, and pus cells cannot be distinguished from normal cells present in milk. Some observers have found five million body cells per cubic centimeter in milk of unquestionably good quality. Streptococci are always present in milk; in fact, milk usually does not sour without them. Tubercle bacilli can be detected by guinea-pig inoculation only, results of which are not available for several weeks. Isolation of pathogenic bacteria from milk is difficult and time-consuming, and, therefore, cannot be carried out in connection with routine examinations. The germs of some diseases are still unknown to science, as, for instance, the germ of scarlet fever. Still we know that scarlet fever is spread by milk. It is evident that bacterial examination of milk must be confined to the colony count.

Glass bottles for containers are usually demanded. Destructible containers are preferable, but have not found favor. Glass bottles and utensils must be completely sterilized according to some contracts. However, satisfactory results can be obtained by washing with boiling water. Complete sterilization under commercial conditions can hardly be expected, and is not necessary.

There are some points which should receive stricter attention than has been the custom. The usual quarantine period of two weeks for newly purchased animals should be extended. It is a notorious fact that cattle dealers sometimes immunize the animals with tuberculin. This immunity may last for six weeks, during which time no reaction can be obtained in tuberculous cattle.

Of greatest importance is efficient medical supervision. This should bind producers not to engage employees until the medical

examiner has passed upon them. A bacteriological examination for germ carriers should be made and the result embodied in the medical inspector's report. Several epidemics, due to Certified Milk, have occurred, and the source of infection has been traced to the dairy. The number of epidemics will increase with the growth of Certified Milk consumption, which at present represents but a fraction of one per cent of the total milk supply. The recurrence of epidemics can be avoided only by introduction of strict medical inspection.

The United States Department of Agriculture score card is commonly used for rating Certified Milk dairies. I would suggest that a score card designed especially for Certified Milk be adopted by this Association. A score for tuberculin testing is not necessary. The contract should demand that, for Certified Milk production, all cows be tested semi-annually and that all reacting animals be removed. On the other hand, bacterial counts should receive recognition. The score card was designed for the purpose of producing clean milk, and the product is measured by the number of bacteria present. The score cannot be high and the number of bacteria high, or the score low with low numbers of bacteria. In order to establish this logical relation of bacterial counts to the total score, the numbers of bacteria should be included in the rating.

Contracts should also contain a provision for the maintaining of an efficient pasteurizing apparatus in every Certified Milk dairy. If, in spite of all precautions, an epidemic should break out through the use of the milk, the Milk Commission should give orders to have the supply pasteurized until further notice.

As a result of the considerations discussed in this paper, it seems advisable that the American Association of Medical Milk Commissions elect a permanent body from its members to investigate periodically the methods of Milk Commissions, and to pass upon the efficiency of experts employed by Commissions. Only by employing *real* experts can Certified Milk be produced which is absolutely above reproach.

DISCUSSION.

Dr. J. W. Van Derslice, Chicago, Illinois: "Dr. Heinemann makes the assertion that, on the score card of the United States Agricultural Department, a farm producing milk with a high bacterial count cannot make a low score. I cannot see that there is anything in common between the score card of the United States Department of Agriculture and the bacterial count of Certified Milk. You will all agree that the equipment of a dairy farm has absolutely nothing to do with the product. Now, then, if we follow the technique of this expert who tells us how to score, we would score above ninety-five per cent if the bacterial count of the milk produced is not above 5,000, seventy per cent if it is 30,000, and nothing if it reaches 100,000. Such scoring, to my mind, would be ridiculous, and I cannot understand why it should be brought to the attention of this Association."

Mr. Ernest Kelly, Washington, D. C.: "I would like to say just a word in regard to the relationship between the score card and the bacterial count of Certified Milk. It is true that they do not always jibe; furthermore, I am not sure that it is desirable to do so. We often find a man who, because of an exceptional personality, will, with poor equipment, still keep the bacterial count of his product at a low figure. I have to agree with Dr. Heinemann in the system he proposes, that the bacterial count of the milk should be taken into account on the score card, but it is a dairy farm score card—you are not scoring the milk, but the farm itself. Unquestionably, there are instances where a high score may obtain with a high bacterial count, and vice versa, but observation of many farms throughout the country has demonstrated that, as a rule, good conditions on a farm will make for a low bacterial count, and average bad conditions for a high bacterial count."

Dr. Harris Moak, Brooklyn, New York: "On three of our farms, aeration is not now, and has not been, employed since they began to produce Certified Milk—two, four, and six years

ago—and these farms are the ones whose products show the lowest bacterial counts. We feel that, if the milk fresh and warm from the cow can be immediately bottled in sterile bottles, capped, and immersed in ice water, it is proof of two things: First, that the stable is so clean that the milk, in passing in small streams from the cow's udder to the pail, does not gather up any stable odors—which, of course, it would do if there were any odors, because the milk really undergoes an enormous amount of aeration in passing from the udder to the pail. Second, that the cow has not been given any strong or unsuitable food too soon before milking. In his paper, Dr. Heinemann states that several epidemics have been traced to Certified Milk. If these epidemics are on record, I should be interested in knowing more about them, and I should think that we, as an organization, should be interested in them in order that we may profit by the experience of others and prevent the future occurrence of epidemics of this kind. One epidemic which occurred in Buffalo is frequently mentioned as having been due to Certified Milk, but it is my understanding that the milk to which this was supposed to have been traced, while it had been sold as Certified Milk, had not been certified by a Medical Milk Commission."

Dr. Henry L. Coit, Newark, New Jersey: "For Dr. Moak's information, I will say that the milk which was responsible for the epidemic of scarlet fever in Buffalo had been certified by a regularly organized Medical Milk Commission.. The milk was contaminated by the middleman through whom it was handled."

Dr. John W. Kerr, Washington, D. C.: "While we have collected statistics of quite a number of milk-borne epidemics, I cannot say that more than one of them has been traced to Certified Milk. I do not think that we, as an Association, can resent the statements made by Dr. Heinemann, because the conditions he pictures might very well occur. I do not know of a Commission in existence to-day that is making routine examinations of dairy employees before they are en-

gaged. Our statistics in Washington show that there are approximately three hundred typhoid bacillus carriers in that city all the time. Typhoid fever is regarded as a rural disease, and when we remember the numerous fingers that come in contact with milk before it is brought to the city, we cannot expect anything else. Of course, we cannot make bacteriological examinations for scarlet fever; it is only through early detection and quarantine of cases that this disease can be eliminated. There is great danger also of contaminating milk with the bacillus of diphtheria. I think that one important point Dr. Heinemann's paper emphasizes is the necessity of making examinations for bacillus carriers, and until this is done as a routine measure, no one need be surprised to see a serious epidemic originating in a Certified Milk Farm."

Dr. T. C. McCleave, Berkeley, California: "With reference to the possibility of epidemics originating from Certified Milk, what I said this morning about formaldehyde in milk was based upon our experience with a small endemic, in which about twenty-five children, who were being fed on Certified Milk, were taken ill the same day with an acute enteric condition, accompanied by fever and prostration. While some of the children were desperately sick, in most of them the symptoms were mild. Every one of them had taken Certified Milk, and every one of them was taken ill on the same day. However, a great many other children in that city had also taken Certified Milk on that day, with no bad effects. The sickness was ascribed to formaldehyde in the milk, which we disproved. The milk from the previous day was examined and found to be all right, and milk examined every day after that for a considerable period was all right; and we were never able to determine what had happened to a portion of the milk on that particular day."

The President stated that, upon adjournment of the meeting, the House of Delegates would convene to elect officers for the ensuing year, and also to consider the question of the

editorial appearing in a recent number of the Journal of the American Medical Association.

The President then declared the meeting adjourned until 8:30 P. M.

PROCEEDINGS OF THE HOUSE OF DELEGATES

The meeting was called to order by the President, Dr. Henry E. Tuley.

The President announced that the first order of business would be the election of a President, for which office the Council had recommended Dr. Ogden M. Edwards, of Pittsburgh, but that nominations from the floor would be in order. After some discussion, during which the names of Drs. Louis C. Ager, Brooklyn, and T. C. McCleave, Berkeley, were placed in nomination and withdrawn, it was moved and seconded that the Secretary be instructed to cast one ballot for Dr. Edwards for President. Carried.

The President stated that the next order of business would be the election of a Secretary, for which office the Council had recommended Dr. Otto P. Geier, Cincinnati. Moved and seconded that the Secretary be instructed to cast one ballot for Dr. Geier. Carried.

The President stated that the next order of business would be the election of a Treasurer, for which office the Council had recommended the present incumbent, Dr. Samuel McC. Hamill, Philadelphia. It was moved and seconded that the Secretary be instructed to cast one ballot for Dr. Hamill. Carried.

The President stated that the rule of the Council which provides that the Chairman of the Council shall retire each year, and the elevation of Dr. Ogden M. Edwards to the Presidency, created two vacancies in the Council, to fill which the Council recommended Dr. T. C. McCleave, Berkeley, and Dr. John R. Williams, Rochester. Moved and seconded that

the Secretary be instructed to cast one vote each for Dr. McCleave and Dr. Williams. Carried.

The President stated that, with respect to the place of the next annual meeting, the Council recommended that this be left to later decision by the Council, for the reason that, when the date and place of the next meeting of the American Medical Association is announced, it may be found practicable to meet at the same time and place. It was moved and seconded that the recommendation of the Council be concurred in. Carried.

Dr. T. C. McCleave, Berkeley, California: "I want to take this opportunity of saying that we are going to insist that you come to California in 1915. We are going to have some other attractions out there at that time, and, along our particular line of work, we plan to have a most comprehensive hygienic exhibit; and we are hoping, even this far ahead, that we will have you with us in 1915."

The President announced that the next order of business would be the consideration of the question of the editorial which appeared in a recent number of the Journal of the American Medical Association.

Discussed by Dr. J. W. Van Derslice, Chicago, who suggested that a committee be appointed to supply the Journal with articles on Certified Milk that would be acceptable to this Association.

Discussed by Dr. I. A. Abt, Chicago, who said that he did not see that any stigma of disgrace attached to the editorial in question.

Discussed by Dr. Louis C. Ager, Brooklyn, who thought that the editor of the Journal should have pointed out the facts mentioned to this Association, and should not have published the article for the benefit of the profession at large.

Discussed by Dr. T. C. McCleave, Berkeley, who stated that the dangers pointed out in the editorial do surround the production of Certified Milk, but thought the editorial unfortunate from the manner in which it was written, the title

implying a doubt as to the safety of Certified Milk in general; and suggested that the editor of the Journal be requested that, when anything on the subject of Certified Milk is to be published in the Journal, the subject matter of the proposed publication be submitted to competent authorities in this Association.

Dr. Charles E. North, New York, asked that the editorial be read, as he had not seen it.

Discussed by Dr. Otto P. Geier, Cincinnati, who suggested that the matter be brought to the attention of the editor of the Journal in no uncertain way by the appointment of a committee, which, if it could not make it convenient to see the editor personally, should take the matter up with him in some other way.

Moved by Dr. Ravenel that the matter be left in the hands of Dr. Geier. Dr. J. W. Van Derslice offered an amendment to this motion to the effect that a committee be appointed, Dr. Geier to be chairman, to look into the matter. Motion as amended seconded and carried. The President appointed Dr. J. W. Van Derslice and Dr. Henry L. Coit as the other members of the Committee.

The business before the house being completed, the President declared the meeting adjourned.

THIRD SESSION

Tuesday Evening, April 30, 1912.

The meeting was called to order by the President, at 8:30 o'clock.

The first thing on the program was the address of the President, which was delivered by Dr. Tuley.

PRESIDENT'S ADDRESS

Henry Enos Tuley, M.D., Louisville, Kentucky

Custom has made it incumbent upon the President of this Association at this time to inflict upon the assembled members, guests, and friends what is dignified by the term "address."

Were it not for that custom, I would not burden you even for these few moments except to take advantage of the occasion to express to you my very great appreciation of the honor conferred upon me at your last meeting by choosing me as your President. I look upon my connection with Milk Commission activities as the most attractive of my professional duties, and my affiliation with this Association from its inception in the mind of our honored Secretary, and its organization meeting, six years ago, in Atlantic City, has been most pleasant and profitable.

No one knows better than I what this Association has developed into, and the enormous amount of work which has been accomplished by the two "fathers," present here to-day, Dr. Henry L. Coit, the founder of the first Milk Commission, and Dr. Otto P. Geier, the founder of the American Association. This work has been done at a great deal of personal sacrifice, and no new Commission has ever been formed except after extensive correspondence with one or both of these indefatigable workers. Personally, I am deeply grateful for their service to humanity, in the way they have spread the "Gospel of Clean Milk," and I am sure I voice the sentiments of the individual and Commission members in this Association in saying so.

No more typical example of true, altruistic service can be had than in the conscientious work of a member of a Medical Milk Commission. Unpaid, misunderstood, accused of graft, and criticised for things done and undone, yet the demand for Certified Milk is to-day greater than could ever have been the dream of Dr. Coit when he first wakened to the idea of the Milk Commission. Proud as we are and should be of the growth in the number of Milk Commissions, evidencing as it does a demand on the part of the people for clean milk and a ready response from the profession in providing the way for this to be accomplished, this Association should take stock now of its membership, and exercise a rigid censorship in the future of applicants for membership. The term "Certified Milk" has now a distinct meaning in the mind of the people, and its use should be jealously safeguarded. The Pure Food Department of the Ken-

tucky Experiment Station was so certain of this popular conception that a suit was brought, under a section of the pure food law against the misbranding of foods, in the case of a dairyman whose product was not certified to by a Milk Commission, but by his private and paid commission. No better work could have been done than that accomplished at this meeting in adopting a final standard of working methods for all Commissions. This manual has been carefully arranged as a result of the questionnaire prepared and digested by the special committee on standards, and the rules laid down can be easily lived up to by every Commission. I appreciate thoroughly that a new Commission must be lenient almost to an extreme, at first, but with the rules of the manual as a goal to be striven for, a perfect working dairy is soon established. Unquestionably, then, the cause which we all have so much at heart will be best conserved by limiting our membership to Commissions which make an honest and faithful attempt to live up to the highest ideals of the Certified Milk propaganda. I would go even a step farther; the Council of the Association through the Secretary should, with the answers to the questionnaire as a guide, keep in close touch with those Commissions which are lenient in their rules or too lax in the enforcement of perfectly good rules, help them by suggestions, and if beyond help, to drop them from our roll of membership.

The producers, as a rule, are high-class men, and are anxious to have high standards established and lived up to; but when a certified dairyman in one county has a nearly perfect score, and knows of a dairyman in an adjoining county whose product is also certified, but hardly better than market milk, it is certain to create discontent and dissatisfaction. A single standard, then, for all, lived up to by all, is the only assurance of the final success of this entire clean milk movement. This Association as a body, or through its Council, has always been ready to listen to the producer, as an individual or as an organized body, on all matters pertaining to dairy husbandry, the price of Certified Milk, and the details of carrying out the Commission's regulations; but beyond that they have not been consulted. The de-

termination of the standards upon which the milk is certified is the function of the Commission only, and will continue so.

The suggestion or plan to lower the standard of production and handling of Certified Milk, in order to make it possible to sell it cheaper, should not be countenanced for a moment. Rather put up the bars higher than lower the standard one particle.

The passage of State laws regulating and limiting the appointment of Milk Commissions to a County Medical Society should be encouraged, and the laws of New York, Kentucky, and New Jersey can be taken as good working models.

The securing of such a law, and the appointment of a Commission in the regular manner, does not insure a properly organized Medical Milk Commission. The mere formation of a Commission and its contract with a dairyman should not constitute eligibility of membership in this Association. At least a year's time should elapse before a new Commission is eligible to membership, and then only after careful examination by the Council of the replies to such questions as were included in the recent questionnaire issued by the committee of the Association. This questionnaire, as all perhaps know, included information on the following points:

First: The dairy hygiene as it relates to the collection, handling, and distribution of the milk.

Second: The chemical and bacteriological conditions of the milk.

Third: The veterinary inspection of the animals; their feeding, housing, hygiene, and health.

Fourth: The physical examination of employees handling the milk; their health and personal hygiene.

Perhaps one of the chief reasons why there is an undercurrent of feeling that the bars should be let down as far as the requirements for Certified Milk are concerned, is that it is now looked upon more as a high-grade market milk than as a *Clinical Milk,* which was the original conception of the term "Certified Milk;" and we should again take that view of it. It is manifestly impossible to produce enought milk of certified grade for general consumption, but by constant municipal supervision, with Certi-

fied Milk as a model, market milk will be brought to a higher standard. In most places where Milk Commissions have been formed, it has had a wholesome and beneficial effect upon the general market supply.

I do not mean to infer that as a prophylactic agent the use of Certified Milk should not be encouraged. I firmly believe that the more general use of Certified Milk in Louisville by babies of the well-to-do, and, through the Babies' Milk Fund Association, by the babies of the poor, has been the means of cutting down the number of cases of gastro-intestinal diseases in infancy throughout the entire year, but especially during the summer.

It has been my experience that, since the formation of the Jefferson County Commission and the production of Certified Milk, the number of cases of gastro-intestinal diseases in summer under my personal observation has steadily decreased, and I am sure that is the experience of my colleagues.

The sale of Certified Milk, if the output is limited, should be confined to the use of babies, the sick, and invalids of all ages; and none sold for general consumption until these classes have been supplied. It should be looked upon as a prescription milk, and sold only upon the recommendation of a physician. Wherever the production of Certified Milk has started, the popular demand will increase, and it will not for long be produced only as a prescription milk.

On the whole, we believe that the work of the various component Commissions forming this body has been satisfactory; but there is room for improvement in all. We trust that stock will be taken and a general improvement ordered by all.

In conclusion, I wish to express for myself and my associates in the Jefferson County Medical Milk Commission the great satisfaction we have had in having this meeting in Louisville. We trust that the deliberations of the Association will be productive of great good, and that the Association will continue its usefulness and always be an inspiration to the highest endeavors to all its members.

The President: "The next thing on the program is the report of the Committee on the Revision of Working Methods

and Standards for the Production of Certified Milk, but as this will be at some length, we will proceed with the rest of the program and hear the report last.

Paper by Dr. John R. Williams, Rochester, New York, entitled, "Municipal Milk Problems—Lantern Slide Exhibition."[1]

THE PROBLEM OF DISTRIBUTION

Introductory Note

The city of Rochester at the present time has a population of about 220,000 inhabitants. Approximately two hundred milk dealers are engaged in the business of supplying these people with milk. According to the standards and published records of the Health Bureau, by which the quality of milk is judged, there has been no material improvement in the milk supply of Rochester during the past twelve years. During that time the average bacterial count of the milk has varied between 200,000 and 800,000 germs per c. c. It is the practice of the Health Bureau to classify as "good" milk that which contains less than 100,000 germs per c. c., and as "bad" when the count ranges between 100,000 and 1,000,000 germs per c. c. Bacterial counts in excess of 1,000,000 are designated as "very bad, due to improper handling, old milk, etc." The following tabulation shows the character of milk, according to these standards, that was sold in Rochester during the years 1911 and 1912:

Character of Milk.			Character of Milk.		
"Good."	"Bad."	"Very bad."	"Good."	"Bad."	"Very bad."
9	78	71	24	90	36

It will be noted that in the year 1911, of 158 dealers studied by the writer, 149, or 94 per cent, were said to have sold "bad" or "very bad" milk; in 1912, out of 150 dealers studied, 126, or

[1]Copyrighted by "The World's Work."

84 per cent, were either "bad" or "very bad." The difference in the two years is explained, not by any improvement in the handling of the milk, but by the more favorable temperature conditions during the last year.

As to what constitutes good or bad milk in the United States is a matter of geography. What is called "bad" milk in Rochester would not be so regarded in other cities like New York, Chicago, and most of the Southern cities, because of the more unfavorable conditions in marketing it. It is probable, however, that Rochester's milk supply is no worse nor no better than the average Northern city .

This economic study of distribution was undertaken because apparently no headway is being made in the endeavor to secure pure milk in this city by mere sanitary regulation.

Scope and Method of Study of Distribution

The problem of distribution was attacked from two standpoints: by a study of the use of milk in homes, and by an investigation of the dealers themselves. In order to get definite knowledge of the use of milk in homes, a very extensive inquiry was made. The city was divided into fifteen sections, so as to include groups of families representing different social standings, earning capacities, nationalities, and general types of occupation. Each section contained from one hundred to seven hundred homes. In all, 5,436 families were visited. Effort was made to learn the number of people in the home, the number of children under five years of age, the amount and kind of milk used, and the name of the distributor. This data is exhibited in tables.

In the case of the dealers, a schedule of questions was prepared which was intended to comprehend all the expenses incurred in the distribution of milk. These include, mainly, the cost of milk, labor, bottles and cans, supplies, dairy room equipment, coal and ice, horse and wagon expenses, interest, etc. The amount of milk and cream sold at wholesale and retail, and the proceeds received therefrom, was also learned. Other information, such as number of customers and length of route, was obtained. At the time the investigation was begun, there were

one hundred and eighty-five licensed and a number of unlicensed vendors engaged in the business. Of these, one hundred and seventy-three licensed dealers were studied. In a few instances information was refused; in most cases, however, the dealers willingly assisted in the inquiry. Very few of them keep any records other than an account of what is owing them and of their own indebtedness. With half a dozen exceptions—among the larger dealers—none of them have an accounting system which makes it possible to determine accurately the cost of the various factors entering into the problem of distribution. Accordingly, in many instances, where no record was available, approximate costs were arrived at after a most diligent inquiry into the business and consultation with experts and others who are in best position to render an opinion. For example, all dealers must have some hot water for cleansing purposes. In those instances where the supply is obtained from the family kitchen, there is no way of determining the cost of the coal used.

Summary of Study of Distribution

For purposes of comparative study, the distributors are divided into four groups, according to the volume of business they do. The first group is composed of 25 dealers, who sell not more than 150 quarts daily; the second group consists of 101 distributors, who sell from 151 to 300 quarts; the third is made up of 44 dealers, who distribute from 131 to 1,000 quarts; in the fourth group are three companies, who dispense from 300 to 8,000 quarts each.

The following statements summarize the important facts learned in this investigation:

1. The distribution of milk in the city of Rochester at the present time is in the hands of a large and ever-changing number of small dealers.

2. They are attracted to and engage in the business because no special training or fitness is required of the initial investment needed, because it can be carried on from the home, which may be located where rent is low.

3. The business of milk distribution is occasionally carried on in conjunction with some other industry or occupation, usually to the detriment of the milk business.

4. The smaller dealers have no fixed prices, but get what they can for their milk.

5. Two thirds of the dealers do not sell more than three hundred quarts daily.

6. There are between three hundred and fifty and four hundred men engaged daily in driving about the city, with as many small milk carts, carrying on an average not more than one hundred and seventy-five quarts of milk.

7. The routes of these deliverymen overlap, so that they travel from ten to twenty times as far as they would need to go were it possible to distribute milk from house to house.

8. There is invested in all these horses and wagons nearly $125,000, which is at least $80,000 more than would be needed were the unnecessary traffic corrected.

9. Most of the milk sold in Rochester is distributed from milk rooms or depots located in stables or wings attached to the barn or home of the dealer.

10. The usual equipment consists of a crude ice-box, a small stove, and a bottle filler.

11. One hundred and seventy of the small dealers have invested $37,000 in this type of equipment, which is far more than would be needed to equip in the most approved manner one modern plant adequate to handle all the business done by them.

12. The three large companies, doing a total daily business of less than fifteen thousand quarts, have more than $38,000 invested in equipment, which is $20,000 more than would be necessary were their business all handled from one depot.

13. The division of the business into a large number of small concerns makes possible tremendous wastes in milk, ice, bottles, and labor, which can scarcely be approximated.

14. In the study of the use of milk in homes it was discovered that many people are afraid to use cow's milk, and use as little as possible.

15. Store milk, condensed milk, and proprietary milks are

used in part because of the fear of cow's milk, but mainly because ice is not afforded.

16. The labor income received by most of the small dealers is very meager; in many cases it is less than the wage of a street laborer. This is the basis of the temptation to adulterate milk, and for the selling of old milk.

The enormous waste incident to the distribution of milk and the saving that could be effected by proper delivery methods is more clearly set forth in the following comparative tabulation:

Under Present System.	Under Model System.
356 men, and in many cases their families.	90 men.
380 horses.	50 horses.
305 wagons.	25 horse-drawn trucks.
2,509 miles travel.	300 miles travel.
$76,600 invested in milk-room equipments.	$75,000 equipment for sanitary plant.
$108,000 invested in horses and wagons.	$30,750 equipment of horses and trucks.
$2,000 present daily cost of distribution.	$600 estimated daily cost of distribution.
$720,000 yearly cost of distribution.	$220,000 estimated yearly cost distribution.

In the foregoing estimates, liberal provision is made for amortization, interest, and superintendence. Mention is not made of all the wastes that could be obviated under efficient management, and it is believed that the conclusions here presented represent most conservative judgment. There is but little question that if the milk supply of Rochester were to be distributed by one agency, properly organized and equipped, a saving to consumers of at least $500,000 yearly could be effected.

Conclusions from Study of Distribution

The results of this study clearly indicate that:

1. The present system of milk distribution such as is found in Rochester, and in most American cities, is very wasteful, and is largely responsible for much of the bad milk that is sold.

2. Were this waste avoided by proper methods of distribution, cleaner and better milk could be furnished the consumer at least two cents per quart less than he is now paying.

3. The attempt to improve the quality of public milk supplies without taking cognizance of the tremendous wastes in the present methods of distribution undoubtedly accounts for our failure to advance in the solution of the municipal milk problem.

4. As with milk production in the country, the municipality should assume control of milk distribution to the end that these wastes be avoided and that its citizens may have an abundant supply of wholesome milk at the lowest possible cost.

General Discussion of the Problem of Distribution

With the exception of three moderate-sized companies, the milk distributors of Rochester may be classed as small dealers. Many of them are men who have worked unsuccessfully at other occupations and have gone into the milk business as a side issue. Occasionally one is to be found who works at a trade and takes care of the milk work outside of the hours of regular employment. Many of them begin business by buying an old horse and a second-hand wagon, and these are often paid for on the installment plan. The usual type of milk wagon is a small, four-wheeled vehicle, with or without top, divided in the center by a seat, and with a carrying capacity of between one hundred and two hundred quarts.

In most cases a portion of the barn is partitioned off and used as the milk room. In other instances a shed-like wing, usually made of second-hand lumber, is built, attached to the house. A few of the more successful small dealers have separate milk houses of very good construction, but most of them are of the type above described. The milk room is generally made no larger than is absolutely necessary for the actual bottling and storing of the milk. Rarely is room provided for the airing or drying of clean cans. The common practice is to set them out in the yard or street, where they are exposed to dust and dirt. The equipment is generally most meager and, with the smallest dealers, consists only of an ice-box and a small stove. Some, however, have not even the latter, but get their supply of hot water from the kitchen. Indeed, where milk houses are located in barns, fire insurance underwriters oppose the use of heating apparatus.

TABLE SHOWING THE USE OF VARIOUS KINDS OF MILK AND OF ICE IN ROCHESTER.

Section.	Class.	Number of Homes.	Number of People.	Quarts of Milk Used Daily.	No. of Families Using.				No Ice Homes in Which Ice Is Used.
					Certified Milk.	Store Milk.	Condensed Exclusively.	Condensed Partly.	
1	Chiefly colored	231	1,128	245	6	48	11	4	91
2	American laboring	523	2,308	532	....	70	23	30	276
3	" "	462	2,067	475	2	103	21	37	257
14	" "	191	851	165	....	10	18	11	70
15	" "	786	.....	1,100	2	62	39	....	446
5	German-American laboring	527	2,647	627	2	28	8	6	230
9	German laboring	234	1,245	289	....	5	10	....	111
7	Italian laboring	643	3,172	388	18	29	52	25	413
8	Jewish laboring	477	2,316	623	26	28	16	32	155
10	American Middle	450	1,939	533	8	13	4	6	149
4	Well-to-do	283	1,176	398	14	4	1	10	29
6	" "	120	518	169	5	....	....	....	9
11	" "	201	891	352	18	1	....	....	....
12	" "	99	495	190	4	1	....	....	3
13	" "	209	845	303	29	....	....	....	4

The sterilization of milk bottles and cans in the majority of milk houses is, therefore, impossible. This important fact has unusual sanitary significance when the possibilities of disease contamination are considered. In the construction of the ice-box, more thought is given to making them water-tight than to the principles of insulation or refrigeration. Accordingly, they are often most uneconomical in their consumption of ice. Many of the better class of dealers have hot-water plants and bottle fillers. A very few of them have other appliances such as are seen in the large companies for the proper utilization of milk excesses and waste. Not only are most of these places unsuited, from a sanitary standpoint, for the purpose, but in the multiplication and reduplication of equipment there is an unnecessary investment of many thousands of dollars. At the time this study was made, there were 170 dealers selling less than 1,000 quarts daily, or a

total of about 47,000 quarts, most of them averaging less than 400 quarts. They had invested in crude ice-boxes, bottle fillers, stoves, cans, etc., more than $37,000. For a much less sum than this, one modern sanitary plant of sufficient capacity to do this business could be equipped with the best and most approved apparatus. This same duplication of equipment is also seen in the case of the three large companies, who have thus invested upwards of $38,000, although the equipment of any one of them is ample to do the business of all three.

One of the most striking facts observed was the large number of milkmen going into each district. For example, in one section, inhabited by German and Jewish working people, there were 57 distributors supplying 363 homes. These 57 peddlers traveled 30 miles in running to and fro in this section, although the same service could easily be rendered by one dealer, who would need to travel not more than one and seven-tenths miles.

UNNECESSARY STREET TRAFFIC OF MILK DISTRIBUTORS IN ROCHESTER.

Section.	Class.	Number of Homes in Section.	Number of Homes Supplied by Distributors.	Number of Distributors Supplying Section.	Number of Miles Distributors Now Travel in Supplying Section.	Number of Miles a Single Distributor Would Travel in Section to Render Same Service.
1	Chiefly Colored.....	231	165	23	20	2.0
2	American laboring.....	523	432	55	45	3.0
3	" "	462	340	40	30	3.0
14	" "	191	167	31	21	1.7
15	" "	786	786	62	57	5.4
5	German-American laboring....	527	508	39	61	4.4
9	German laboring.....	234	145	39	20	1.7
7	Italian laboring.....	643	253	61	36	2.0
8	Jewish laboring.....	477	363	57	30	1.7
10	American middle.....	450	443	26	48	2.4
4	Well-to-do.....	283	273	27	24	2.6
6	" "	120	120	14	12	1.2
11	" "	201	166	25	21	2.5
12	" "	99	91	17	14	2.0
13	" "	209	216	34	38	2.5

In the Italian section, 61 distributors were found traveling 36 miles in supplying 353 homes, although the same service could be rendered by one agency in a travel of not more than three miles. This great waste of energy and useless traffic is not confined to the poorer districts; it is just as great in the sections occupied by the well-to-do. In one such district studied there were 27 milk peddlers for 273 homes. These dealers traveled daily in this section 24 miles, although the total length of streets is less than two miles. On many streets there is a different milk dealer for every two homes; oftentimes several dealers will be found going to one home. In one instance nine dealers were found, each delivering one pint of milk to one small home. Aside from the economic waste, there are other well-grounded objections in the street noise, dirt, and general nuisance occasioned by the rattling and banging of unnecessary milk wagons on the city streets.

Similarly, in the matter of horses and wagons there is also great extravagance. The 170 small dealers now use 295 horses and 255 wagons in the delivery of their milk. These represent an investment of $82,400. The same service could be rendered by one agency with forty horses, 16 trucks, and 2 motor trucks, costing approximately $29,000—a saving in investment of at least $62,000 per year. The three large companies, selling over 1,000 quarts daily, employ 65 horses and 50 wagons, costing about $25,000. Under proper and efficient methods of distribution, it could be done by 12 horses, 4 trucks, and 1 motor truck, which would afford a saving in investment of about $18,000.

In order to test the accuracy of these conclusions, a direct experiment in distribution was made. At the present time the average retail delivery wagon, requiring the services of one man and one horse, distributes daily about 175 quarts of milk. By actual test, it was demonstrated that milk can be delivered most economically and efficiently by using a large two-horse truck carrying 1,000 quarts of milk, manned by a driver and two assistants, and by making house-to-house distributions. In the poorer and crowded sections of the city, notwithstanding the small amounts of milk used, milk could be delivered at the rate of

400 quarts per hour, while in the well-to-do districts, where houses are further apart, but where milk is used, it could be distributed at the rate of 500 quarts an hour. Thus in a working day of eight hours, three men and one two-horse truck, under conditions favoring efficiency, could deliver between 3,200 and 4,000 quarts of milk. Under such a system it would be desirable to have a large motor supply truck to replenish the delivery trucks on their routes. At the present time approximately twenty men and twenty horses and wagons are required to render this amount of service. A single efficient agency should be able to distribute this amount of milk for not more than $15 per day. At the present time it costs at least $65 per day. This difference of $50 is the price paid by the consumer for needless efforts and wasted energies of the large number of peddlers now supplying a dozen city blocks. It represents sheer loss, because milk distributors under the present absurd competitive system benefits no one, not even the dealer.

EXPERIMENT IN MILK DISTRIBUTION.

Section: Streets.	Baden, Catherine, Vienna, Morris.	Barrington, Dartmouth, Westminster Road, Rutgers.
Families living in single houses	248	284
Families living in double houses	202	52
Families living in apartments	154	23
Total number of families visited in section	604	359
Houses having milk-boxes	11	297
Houses having no milk-boxes	593	52
Average amount milk used daily in homes	1.3 qts.	3 qts.
Total amount milk used daily in section	785 qts.	1,077 qts.
Total length of streets in section	1.6 miles	2.5 miles
Distance traveled by truck in section	1.7 "	2.4 "
Distance traveled by present peddlers in supplying section	30 "	38 "
Average time required to go from truck to each two houses, leave milk, and return to truck	48 seconds	62 seconds
Stops made by truck	78	67
Total time of experiment	2 hours	2 hours
Total time truck was in motion	34 min. 45 sec.	40 min. 2 sec.
Total time truck was standing still	1 hr. 25 min. 15 sec.	1 hr. 19 min. 15 sec.

An examination of the accounting of various groups of dealers, as exhibited in Table No. 4, shows conclusively that most of the distributors make only a very meager living. In many cases, the income is much less than that of day laborers and unskilled mechanics. This fact, taken in conjunction with the fluctuations in trade and the losses which commonly occur, makes the business a most precarious one. For these reasons, the less responsible dealers are tempted to recoup their losses by resorting to various practices, most common of which is bottle stealing and adulterating and selling old milk.

While much of this milk sold by small dealers in the poorer sections is dipped from cans, practically all dealers use some bottles. It is estimated that the average milk bottle makes from twelve to fifteen trips to the consumer, when it is either lost, broken, or stolen. The small dealers particularly are guilty of appropriating the bottles of their larger competitors. In an examination of the bottles being used by one reputable dealer, fourteen out of twenty-four were found to belong to other distributors. In the crates of another dealer, seventeen out of twenty-four bore the names of other distributors. Many families take from more than one milkman, and it is not uncommon for the first peddler on the ground to take the bottles of the others. This practice of using the bottles of other dealers is by no means confined to a few irresponsible concerns; on the contrary, it is quite general. Out of this custom has developed a spirit of carelessness in the handling of bottles, with the result that thousands of them yearly are needlessly broken and thrown away. In the yards of most dealers will be seen barrels of broken bottles, representing many dollars' loss. On the premises of one small dealer were found five large barrels, each full of broken glass, representing at least one thousand bottles, most of them belonging to other dealers. They cost their original purchasers at least $55.

Milk dealers, however, are not the only ones who are guilty of this wastefulness, for to the consumer must be charged a large part of this unnecessary loss. Every year thousands of bottles are used in homes and shops for the storing of food and for other purposes. Thousands of them are thrown into the

ash cans and rubbish cans, and are thus broken or lost. Recently the city has established a plant for the sorting of rubbish and the saving of such portions as are valuable. During the past six months two thousand good milk bottles have thus been rescued, but at least as many more were broken and destroyed. The average price paid for a milk bottle is five and one-half cents. With these figures in mind, it will readily be appreciated that the yearly loss from theft and carelessness is very great. In Rochester it is at least $10,000 a year. This is a tax which contributes to the cost of milk, benefiting only the maker of bottles, and is one which the consumer, of course, must bear.

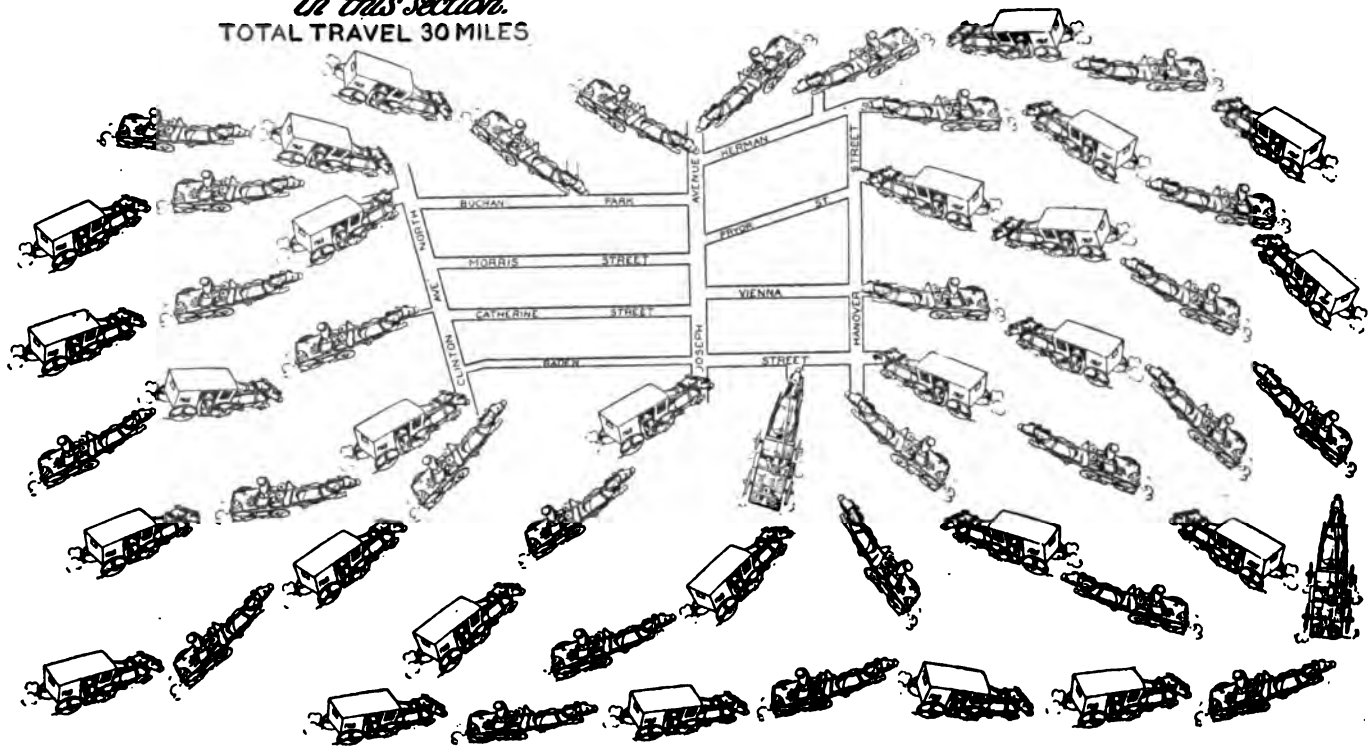
TABLE No. 4, SHOWING THE TOTAL ACCOUNTING OF MILK DISTRIBUTORS IN ROCHESTER, GROUPED ACCORDING TO THE VOLUME OF BUSINESS DONE.

Schedules.	Distributors Selling Daily.				Totals.
	Not More Than 150 qts.	From 151 to 300 qts.	From 301 to 1,000 qts.	1,000 qts. or More.	
Number of distributors	25	101	44	3	173
Milk, retail	2,887	21,368	17,180	8,900	50,335
Milk, wholesale	129	2,411	3,415	6,000	11,947
Total milk sold	3,016	23,799	20,599	14,900	63,314
Number men employed	29	133	99	95	356
No horses	34	160	101	65	360
Number wagons	26	137	92	50	305
Length of route in miles	199	1,053	616	641	2,509
Number customers	1,885	13,915	9,490	9,800	35,090
Value milk-room equipment	$3,300	$17,295	$16,750	$38,450	$76,902
Value horses and wagons	8,815	45,105	28,495	25,035	107,450
Value real estate	.....	.....	.....	96,700	96,700
Total investment	11,222	62,400	44,245	160,185	278,052
Interest and depreciation on investment	6 17	34 17	25 16	45 15	110 65
Cost of coal and ice	8 92	42 25	39 03	17 20	107 40
Milk shrinkage, waste, etc	4 35	36 59	28 55	14 55	84 04
Maintenance horse and wagon	25 30	152 50	101 00	100 00	378 80
Daily wages, labor	5 60	48 95	74 20	193 06	321 81
Cost of bottles	7 38	77 36	74 89	21 00	180 63
Total cost of distribution	57 72	392 82	342 83	390 98	1,184 35
Amount paid producer	128 71	999 55	880 44	886 40	2,895 10
Total cost to distributor	186 43	1,192 37	1,223 27	1,277 38	4,079 45
Milk receipts, retail	213 31	1,535 05	1,254 67	682 00	3,685 03
Receipts, wholesale	.....	138 26	195 87	314 50	548 63
Cream receipts	6 75	60 84	106 20	67 51	241 50
Total receipts	220 06	1,734 15	1,556 74	1,366 01	4,876 96
Labor income	37 59	341 78	333 47	78 58	79 42
Labor income loss	3 96	.....	.....	.....	3 96

57 Milk Peddlers for 363 Homes in this section.

TOTAL TRAVEL 30 MILES

THIS SERVICE COULD BE RENDERED BY ONE DISTRIBUTOR IN A TRAVEL OF 2 MILES

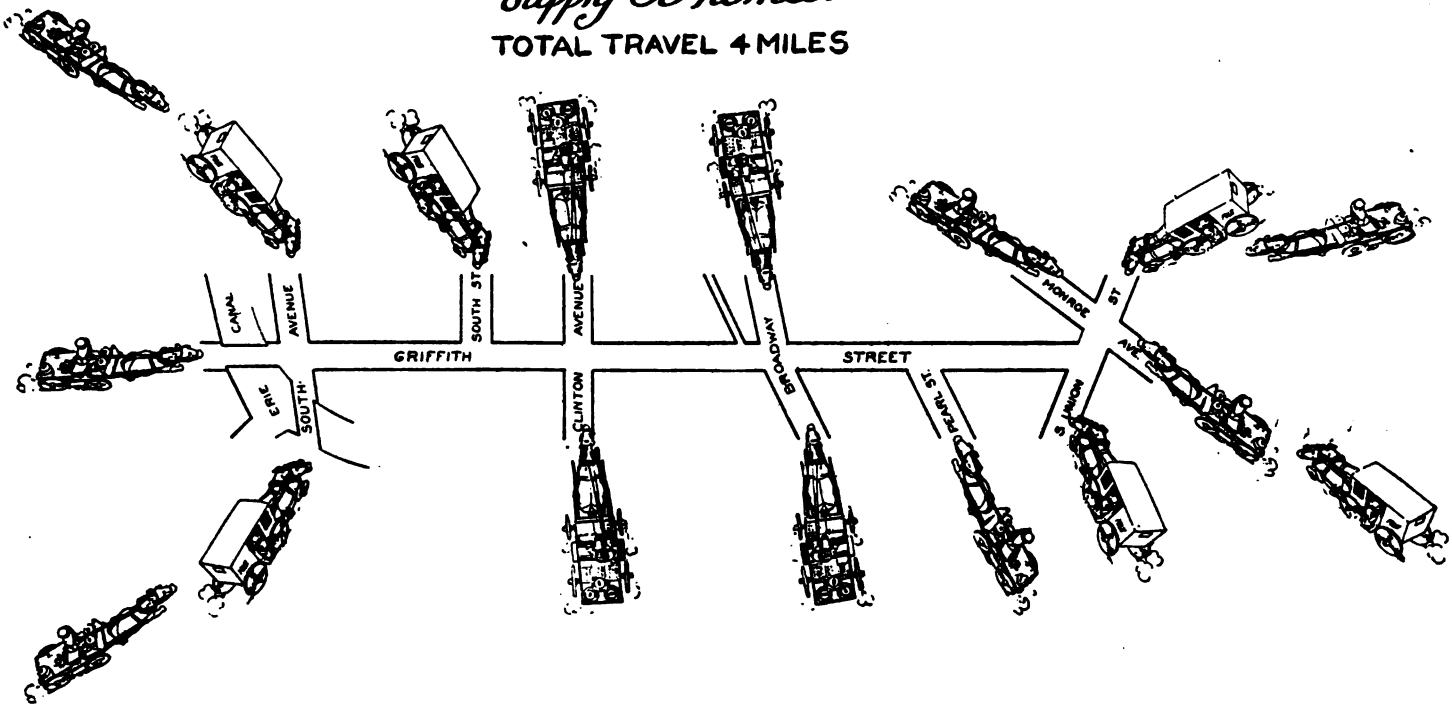


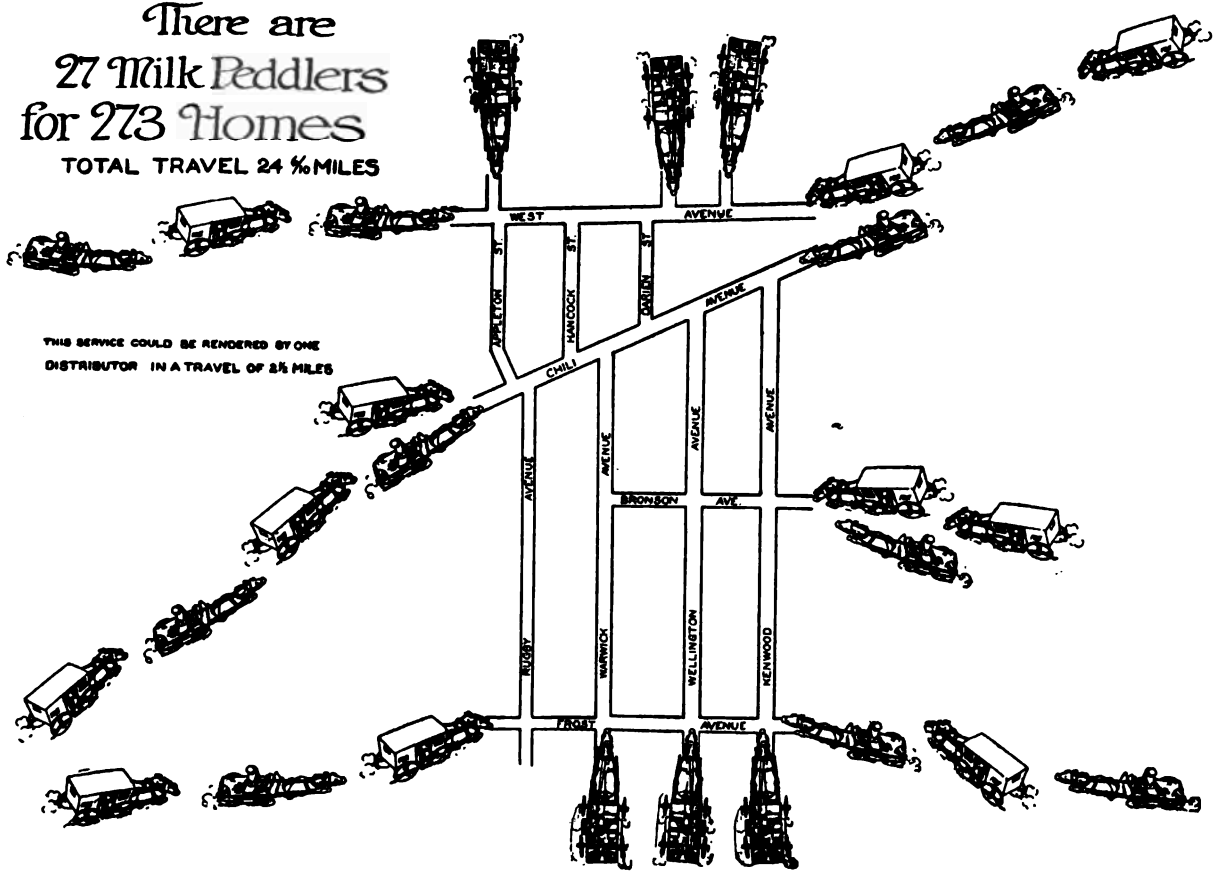
Griffith St.

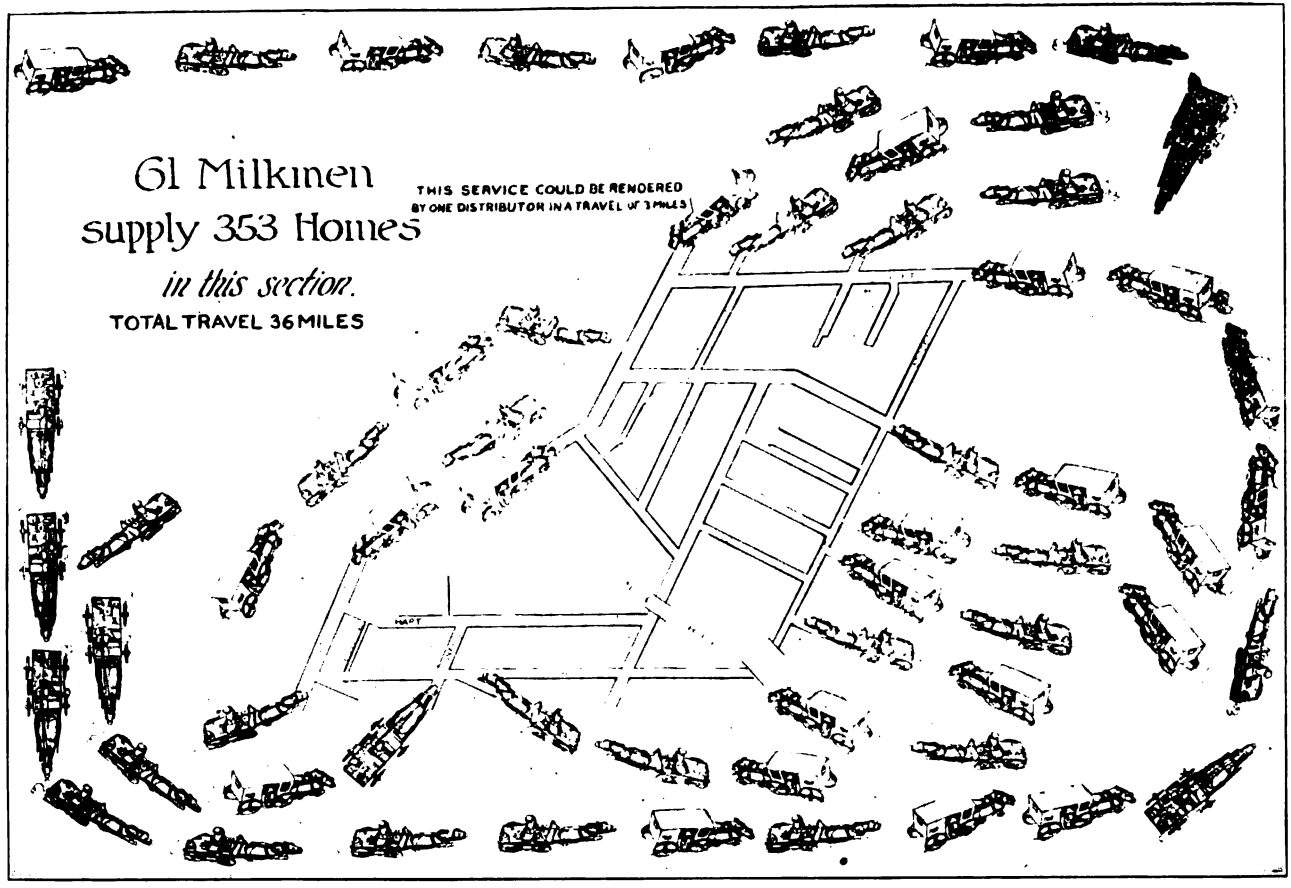
17 Milk Peddlers supply 38 homes.

TOTAL TRAVEL 4 MILES

THIS SERVICE COULD BE RENDERED BY ONE DISTRIBUTOR IN A TRAVEL OF LESS THAN ½ OF A MILE




There are
27 Milk Peddlers
for 273 Homes
TOTAL TRAVEL 24 ¾ MILES
THIS SERVICE COULD BE RENDERED BY ONE
DISTRIBUTOR IN A TRAVEL OF 2½ MILES
WEST
AVENUE
APPLETON ST.
HANCOCK ST.
ANSTON ST.
CHILI AVENUE
CHILI
AVENUE
AVENUE
AVENUE
AVENUE
BRONSON AVE.
RUGBY
WARWICK
WELLINGTON
KENWOOD
FIRST AVENUE

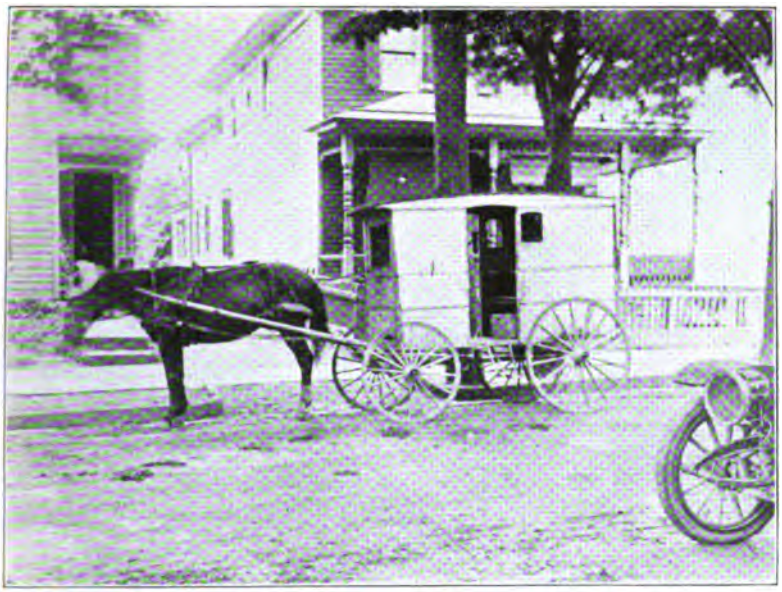

61 Milkmen
supply 353 Homes
in this section.
TOTAL TRAVEL 36 MILES
THIS SERVICE COULD BE RENDERED
BY ONE DISTRIBUTOR IN A TRAVEL OF 3 MILES



Home of small dealer. Ten adults and seven children live in this four-room cottage. Milk-room in cellar.



Typical arrangement of barn and milk-house of dealer selling 300 quarts daily. Average bacteria count in 1911 was 837,000 per cubic centimeter; in 1912 it was 1,863,000 per cubic centimeter. At least $100,000 is invested in crude buildings of this type. This amount of money would build a modern sanitary plant adequate for the needs of the entire city.



Many small dealers begin business by purchasing a wornout horse and the discarded wagon of a more prosperous distributor. Oftentimes these dealers sell milk without going through the formality of procuring a license. More than $100,000 is invested in horses and wagons of this type. If distribution were properly carried on, $30,000 would furnish ample equipment of horses and trucks.



Much dipped or loose milk is sold by the small dealers in the poorer districts. This peddler has gone into the house and has left his milk-dipper hanging on the fence. This illustrates the irresponsibility and lack of fitness for the business of many of the small vendors.



Combination barn and milk-house of large dealer. Note the proximity of manure-box to milk-room. This building is typical of the kind used by dealers selling between 300 and 1,000 quarts daily.



Milk depot of dealer in small store, with no equipment or facilities for handling milk but a crude ice-box. Note the washed cans out on the sidewalk to air. Bacteria count of milk in 1912 averaged 1,040,000 per cubic centimeter.



Milk-house of dealer selling about 700 quarts daily. Average bacterial count of milk in 1911 was 2,107,000 per cubic centimeter. In 1912 it was 3,025,000 per cubic centimeter.



Small makeshift milk-house attached to dwelling of dealer selling 300 quarts daily. Average bacterial count in 1911 was 1,050,000 per cubic centimeter. In 1912, was 2,609,000 per cubic centimeter.



Several hundred milk bottles, over half of them broken, are gathered from ash cans every month by the city rubbish collectors. They are sorted out at the municipal incinerator, and when possible returned to their owners. They form striking evidence of the carelessness and wastefulness of housekeepers. It is estimated that the milk dealers of Rochester lose annually about $10,000 from broken and stolen bottles.



In the yard of this dealer were found five barrels of broken glass representing at least 1,000 milk bottles which were destroyed by careless handling. They are the accumulation of about eighteen months. The dealer confessed that they were all the property of his competitors.



The bottles of seventeen different dealers were found in two crates in this dairy. This dealer also had bottles belonging to milk companies in New York, Boston, and Philadelphia. Bottle stealing is common with small dealers.



Fourteen bottles, all belonging to other dealers, were found in two crates belonging to this dealer.



Typical and inefficient crude milk-room equipment of small dealer. More than $76,000 is invested in equipment of this character. This amount of money would well equip one sanitary plant which could properly handle all the milk which is now being imperfectly cared for in 200 rooms like the above.



Combined barn and milk-room of small dealer. Note the sick horse suspended from the ceiling; also the milk-room in the corner.



Interior of milk-room of one of the three large distributing companies of the city. This depot is properly and amply equipped to handle the business of the two competing companies, a waste in investment of at least $20,000.



It was moved and seconded that the Association extend to Dr. Williams a vote of thanks for the comprehensive way in which he had presented the subject. Carried.

The report of the Committee on the Revision of Working Methods, etc., was then called for, and made by Dr. John W. Kerr, who first took occasion to extend the thanks of the committee to the various Commissions for the data furnished by them.

MEMORANDUM OF AMENDMENTS

Offered to Manual of Working Methods and Standards for the Production of Certified Milk, and Adopted by the American Association of Medical Milk Commissions at Louisville Meeting, April 30-May 1, 1912

1. That the minimum percentage of cream shall be eighteen per cent.

2. That the section providing that "Certified Milk shall not be subjected to heat" be amended by the addition of the clause, "unless authorized by the Commission to meet temporary emergencies."

3. That the percentage of cream shall be noted on the cap of the bottle.

4. That as a substitute for the section relating to the time limit for marketing Certified Milk, the words "not more than thirty-six hours old" be inserted.

5. That the section relating to the preparation of tuberculin to be used in testing herds be amended by the addition of the words "under Government auspices."

6. That the clause reading, "proper aeration to reduce the milk to a temperature of forty-five degrees," etc., be changed to "proper cooling to reduce the milk to a temperature of forty-five degrees."

7. That in paragraph 37 the word "lip" be substituted for the word "neck."

8. That a clause be added to the effect that the cap of the bottle shall bear either the date of production of the milk or the date on which it is to be sold, the choice of dates to be left to the discretion of the Commission.

METHODS AND STANDARDS FOR THE PRODUCTION AND DISTRIBUTION OF CERTIFIED MILK.[1]

Certified Milk is the product of dairies operated in accordance with accepted rules and regulations formulated by authorized Medical Milk Commissions to ensure its purity and adaptability for infants and invalids.

The need for such a milk was experienced primarily by those engaged in the conservation of the life and health of infants. As a result, there was formulated in 1892 a plan whereby Certified Milk would be produced by a dairyman under the control of a Medical Milk Commission designated by a representative medical Society.

The first rules designed for this purpose were those contained in an agreement entered into by a Medical Milk Commission and the dairymen concerned.[2]

The rules contained in the original agreement mentioned represented the essential requirements for the production of Certified Milk. Following this precedent, other Commissions were organized, which, in 1906, became federated into a National Association known as the "American Association of Medical Milk Commissions."

A fundamental object of this Association was to bring about the uniformity of standards and their perfection. This result has been reached by the adoption, from time to time, of definite standards relating to the veterinary inspection of herds and farms; the medical inspection of employees handling the milk, and the bacteriological and chemical examinations as to quality

[1] At the fifth annual meeting of the American Association of Medical Milk Commissions, held in Philadelphia, May 25, 1911, a committee was appointed to revise the manual of working methods and standards for the guidance of Medical Milk Commissions in the supervision of the production and distribution of certified milk. The report of this committee, which was adopted at the sixth annual meeting at Louisville, Kentucky, in May, 1912, includes a statement concerning the certified milk movement, as well as the revised methods and standards, and is published for the information of those interested in the improvement of public milk supplies.

[2] Bul. 56. Hygienic Laboratory, Public Health and Marine Hospital Service.

and purity. The requirements with respect to these four topics have been previously reported upon by committees and adopted by the Association, and at its last annual meeting, provision was made for their further revision and amplification.

Organization of Medical Milk Commissions.

The Medical Milk Commission is appointed by a representative medical society, and acts under its auspices and for it, to encourage the production of milk of the highest possible standards of purity. No commision should be considered as certifying milk that does not conform to the standards adopted from time to time by the Association of Medical Milk Commissions. The Commission should include at least five members or a number sufficient to become responsible for and to carry on the following divisions of work:

a. The hygiene of the dairy, as it relates to the production and distribution of the milk; b. The veterinary supervision of the herd; c. The medical supervision of the employees; d. The chemical and bacteriological examinations of the milk.

Duties of the Commission.

After its organization, the Commission should designate a veterinarian, a physician, a chemist, and a bacteriologist to enforce its methods and standards, which shall be the prevailing methods and standards of the American Association of Medical Milk Commissions, and these officers shall be required to render regular reports of their inspections and examinations. A uniform written agreement shall then be entered into with any dairyman who is desirous of undertaking the production of Certified Milk, and the investigation of whose plant shows it to be properly equipped for such purpose. Such agreement shall require the observance of the methods and standards hereinbefore mentioned.

Upon receipt of favorable reports from the several experts and committee which have made the investigations, the dairyman shall be authorized, in accordance with the terms of the agreement, to employ the term "Certified Milk," and he shall be required to attach to all containers of any character used in

distributing the milk produced under the agreement a certificate or seal bearing the term "Certified Milk," the name of the Medical Milk Commission certifying it, and the day or date of production of the milk contained therein.

Hygiene of the Dairy.

(Under the supervision and control of the Veterinarian.)

1. **Pastures or Paddocks.**—Pastures or paddocks to which the cows have access shall be free from marshes or stagnant pools, crossed by no stream which might become dangerously contaminated, at sufficient distances from offensive conditions to suffer no bad effects from them, and shall be free from plants which affect the milk deleteriously.

2. **Surroundings of Buildings.**—The surroundings of all buildings shall be kept clean and free from accumulations of dirt, rubbish, decayed vegetable or animal matter or animal waste, and the stable yard shall be well drained.

3. **Location of Buildings.**—Buildings in which Certified Milk is produced and handled shall be so located as to insure proper shelter and good drainage, and at sufficient distance from other buildings, dusty roads, cultivated and dusty fields, and all other possible sources of contamination; provided, in the case of unavoidable proximity to dusty roads or fields, the exposed side shall be screened with cheese cloth.

4. **Construction of Stables.**—The stables shall be constructed so as to facilitate the prompt and easy removal of waste products. The floors and platforms shall be made of cement or other non-absorbent material, and the gutters of cement only. The floors shall be properly graded and drained, and the manure gutters shall be from six to eight inches deep and so placed in relation to the platform that all manure will drop into them.

5. **The Inside Surface** of the walls and all interior construction shall be smooth, with tight joints, and shall be capable of shedding water. The ceiling shall be of smooth material and dust-tight. All horizontal and slanting surfaces which might harbor dust shall be avoided.

6. **Drinking and Feed Troughs.**—Drinking troughs or basins shall be drained and cleaned each day, and feed troughs and mixing floors shall be kept in a clean and sanitary condition.

7. **Stanchions.**—Stanchions when used shall be constructed of iron pipes or hard wood, and throat latches shall be provided to prevent the cows from lying down between the time of cleaning and the time of milking.

8. **Ventilation.**—The cow stables shall be provided with adequate ventilation either by means of some approved artificial device, or by the substitution of cheese cloth for glass in the windows, each cow to be provided with a minimum of six hundred cubic feet of air space.

9. **Windows.**—A sufficient number of windows shall be installed and so distributed as to provide satisfactory light and a maximum of sunshine; two feet square of window area to each six hundred cubic feet of air space to represent the minimum. The coverings of such windows shall be kept free from dust and dirt.

10. **Exclusion of Flies, etc.**—All necessary measures shall be taken to prevent the entrance of flies and other insects, and rats and other vermin into all the buildings.

11. **Exclusion of Animals from the Herd.**—No horses, hogs, dogs, or other animals or fowls shall be allowed to come in contact with the certified herd, either in the stables or elsewhere.

12. **Beddings.**—No dusty or moldy hay or straw, bedding from horse stalls, or other unclean materials shall be used for bedding the cows. Only bedding which is clean, dry, and absorbent may be used—preferably shavings or straw.

13. **Cleaning Stable and Disposal of Manure.**—Soiled bedding and manure shall be removed at least twice daily, and the floors shall be swept and kept free from refuse. Such cleaning shall be done at least one hour before the milking time. Manure, when removed, shall be drawn to the field or temporarily stored in containers so screened as to exclude flies. Manure shall not be even temporarily stored within three hundred feet of the barn or dairy building.

14. **Cleaning of Cows.**—Each cow in the herd shall be groomed daily, and no manure, mud, or filth shall be allowed to remain upon her during milking; for cleaning, a vacuum apparatus is recommended.

15. **Clipping.**—Long hairs shall be clipped from the udder and flanks of the cow, and from the tail above the brush. The hair on the tail shall be cut so that the brush may be well above the ground.

16. **Cleaning of Udders.**—The udders and teats of the cow shall be cleaned before milking; they shall be washed with a cloth and water, and dry wiped with another clean, sterilized cloth—a separate cloth for drying each cow.

17. **Feeding.**—All foodstuffs shall be kept in an apartment separate from and not directly communicating with the cow barn. They shall be brought into the barn only immediately before the feeding hour, which shall follow the milking.

18. Only those foods shall be used which consist of fresh, palatable, or nutritious materials, such as will not injure the health of the cows or unfavorably affect the taste or character of the milk. Any dirty or moldy food or food in a state of decomposition or putrefaction shall not be given.

19. A well-balanced ration shall be used, and all changes of food shall be made slowly. The first few feedings of grass, alfalfa, ensilage, green corn, or other green feeds shall be given in small rations and increased gradually to full ration.

20. **Exercise.**—All dairy cows shall be turned out for exercise at least two hours in each twenty-four in suitable weather. Exercise yards shall be kept free from manure and other filth.

21. **Washing of Hands.**—Conveniently located facilities shall be provided for the milkers to wash in before and during milking.

22. The hands of the milkers shall be thoroughly washed with soap, water, and brush, and carefully dried on a clean towel immediately before milking. The hands of the milkers shall be rinsed with clean water and carefully dried before milking each cow. The practice of moistening the hands with milk is forbidden.

23. **Milking Clothes.**—Clean overalls, jumper, and cap shall be worn during milking. They shall be washed or sterilized each day, and used for no other purpose, and when not in use they shall be kept in a clean place, protected from dust and dirt.

24. **Things to be Avoided by Milkers.**—While engaged about the dairy or in handling the milk, employees shall not use tobacco nor intoxicating liquors. They shall keep their fingers away from their nose and mouth, and no milker shall permit his hands, fingers, lips, or tongue to come in contact with milk intended for sale.

25. During milking the milkers shall be careful not to touch anything but the clean top of the milking stool, the milk pail, and the cow's teats.

26. Milkers are forbidden to spit upon the walls or floors of stables, or upon the walls or floors of milk houses, or into the water used for cooling the milk or washing the utensils.

27. **Fore milk.**—The first streams from each teat shall be rejected, as this fore milk contains large numbers of bacteria. Such milk shall be collected into a separate vessel and not milked onto the floors or into the gutters. The milking shall be done rapidly and quietly, and the cows shall be treated kindly.

28. **Milk and Calving Period.**—Milk from all cows shall be excluded for a period of forty-five days before and seven days after parturition.

29. **Bloody and Stringy Milk.**—If milk from any cow is bloody and stringy, or of unnatural appearance, the milk from that cow shall be rejected and the cow isolated from the herd until the cause of such abnormal appearance has been determined and removed, special attention being given in the meantime to the feeding or to possible injuries. If dirt gets into the pail, the milk shall be discarded, and the pail washed before it is used.

30. **Make-up of Herd.**—No cows except those receiving the same supervision and care as the certified herd shall be kept in the same barn or brought in contact with them.

31. **Employees other than Milkers.**—The requirements for milkers, relative to garments and cleaning of hands, shall apply

to all other persons handling the milk, and children unattended by adults shall not be allowed in the dairy nor in the stable during milking.

32. **Straining and Strainers.**—Promptly after the milk is drawn, it shall be removed from the stable to a clean room and then emptied from the milk pail to the can, being strained through strainers made of a double layer of finely meshed cheese cloth or absorbent cotton thoroughly sterilized. Several strainers shall be provided for each milking in order that they may be frequently changed.

33. **Dairy Building.**—A dairy building shall be provided which shall be located at a distance from the stable and dwelling prescribed by the local Commission, and there shall be no hog pen, privy, or manure pile at a higher level or within one hundred feet of it.

34. The dairy building shall be kept clean and shall not be used for purposes other than the handling and storing of milk and milk utensils. It shall be provided with light and ventilation, and the floors shall be graded and watertight.

35. The dairy building shall be well lighted and screened and drained through well-trapped pipes. No animals shall be allowed therein. No part of the dairy building shall be used for dwelling or lodging purposes, and the bottling room shall be used for no other purpose than to provide a place for clean milk utensils and for the handling of the milk. During bottling, this room shall be entered only by persons employed therein. The bottling room shall be kept scrupulously clean and free from odors.

36. **Temperature of Milk.**—Proper cooling to reduce the temperature to 45° F. shall be used, and aerators shall be so situated that they can be protected from flies, dust, and odors. The milk shall be cooled immediately after being milked, and maintained at a temperature between 35° and 45° F. until delivered to the consumer.

37. **Sealing of Bottles.**—Milk, after being cooled and bottled, shall be immediately sealed in a manner satisfactory to

the Commission, but such seal shall include a sterile hood which completely covers the lip of the bottle.

38. **Cleaning and Sterilizing of Bottles.**—The dairy building shall be provided with approved apparatus for the cleansing and sterilizing of all bottles and utensils used in milk production. All bottles and utensils shall be thoroughly cleaned by hot water and salsoda or equally pure agent, rinsed until the cleaning water is thoroughly removed, then exposed to live steam or boiling water at least twenty minutes, and then kept inverted until used, in a place free from dust and other contaminating materials.

39. **Utensils.**—All utensils shall be so constructed as to be easily cleaned. The milk pail should preferably have an elliptical opening 5x7 inches in diameter. The cover of this pail should be so convex as to make the entire interior of the pail visible and accessible for cleaning. The pail shall be made of heavy, seamless tin, and with seams which are flushed and made smooth by solder. Wooden pails, galvanized iron pails, or pails made of rough, porous materials, are forbidden. All utensils used in milking shall be kept in good repair.

40. **Water Supply.**—The entire water supply shall be absolutely free from contamination, and shall be sufficient for all dairy purposes. It shall be protected against flood or surface drainage, and shall be conveniently situated in relation to the milk house.

41. **Privies, etc., in Relation to Water Supply.**—Privies, pig-pens, manure piles, and all other possible sources of contamination shall be so situated on the farm as to render impossible the contamination of the water supply.

42. **Toilet Rooms.**—Toilet facilities for the milkers shall be provided and located outside of the stable or milk house. These toilets shall be kept clean, and shall be accessible to wash basins, water, nail brush, soap and towels, and the milkers shall be required to wash and dry their hands immediately after leaving the toilet room.

Transportation.

43. In transit, the milk packages shall be kept free from dust and dirt. The wagon, trays, and crates shall be kept scrupulously clean. No bottles shall be collected from houses in which communicable diseases prevail, unless a separate wagon is used and under conditions prescribed by the Department of Health and the Medical Milk Commision.

44. All Certified Milk shall reach the consumer within thirty-six hours after milking.

Veterinary Supervision of the Herd.

45. **Tuberculin Test.**—The herd shall be free from tuberculosis, as shown by the proper application of the tuberculin test. The test shall be applied in accordance with the rules and regulations of the United States Government, and all reactors shall be removed immediately from the farm.

46. No new animals shall be admitted to the herd without first having passed a satisfactory tuberculin test, made in accordance with the rules and regulations mentioned; the tuberculin to be obtained and applied only by the official veterinarian of the Commission.

47. Immediately following the application of the tuberculin test to a herd for the purpose of eliminating tuberculous cattle, the cow-stable and exercising yards shall be disinfected by the veterinary inspector in accordance with the rules and regulations of the United States Government.

48. A second tuberculin test shall follow each primary test after an interval of six (6) months, and shall be applied in accordance with the rules and regulations mentioned. Thereafter, tuberculin tests shall be re-applied annually, but it is recommended that the retests be applied semi-annually.

49. **Identification of Cows.**—Each dairy cow in each of the certified herds shall be labeled or tagged with a number or mark which will permanently identify her.

50. **Herd Book Record.**—Each cow in the herd shall be registered in a herd book, which register shall be accurately kept

so that her entrance and departure from the herd and her tuberculin testing can be identified.

51. A copy of this herd book record shall be kept in the hands of the veterinarian of the Medical Milk Commission under which the dairy farm is operating, and the veterinarian shall be made responsible for the accuracy of this record.

52. **Dates of Tuberculin Tests.**—The dates of the annual tuberculin tests shall be definitely arranged by the Medical Milk Commission, and all of the results of such tests shall be recorded by the veterinarian and regularly reported to the secretary of the Medical Milk Commission issuing the certificate.

53. The results of all tuberculin tests shall be kept on file by each Medical Milk Commission, and a copy of all such tests shall be made available to the American Association of Medical Milk Commissions for statistical purposes.

54. The proper designated officers of the American Association of Medical Milk Commissions shall receive copies of all of the annual, the semi-annual, and other official tuberculin tests which are made, and keep copies of the same on file and compile them annually for the use of the Association.

55. **Disposition of Cows Sick with Diseases other than Tuberculosis.**—Cows having rheumatism, leucorrhea, inflammation of the uterus, severe diarrhea, or disease of the udder, or cows that from any other cause may be a menace to the herd, shall be removed from the herd and placed in a building separate from that which may be used for the isolation of cows with tuberculosis, unless such building has been properly disinfected since it was last used for this purpose. The milk from such cows shall not be used, nor shall the cows be restored to the herd until permission has been given by the veterinary inspector after a careful physical examination.

56. **Notification of Veterinary Inspector.**—In the event of the occurence of any of the diseases just described between the visits of the veterinary inspector, or if at any time a number of cows become sick at one time in such a way as to suggest the outbreak of a contagious disease or poisoning, it shall be

the duty of the dairyman to withdraw such sickened cattle from the herd, to destroy their milk, and to notify the veterinary inspector by telegraph or telephone immediately.

57. **Emaciated Cows.**—Cows that are emaciated, from chronic diseases or from any cause that in the opinion of the veterinary inspector may endanger the quality of the milk, shall be removed from the herd.

Bacteriological Standards.

58. **Bacterial Counts.**—Certified Milk shall contain less than 10,000 bacteria per cubic centimeter when delivered. In case a count exceeding 10,000 bacteria per cubic centimeter is found, daily counts shall be made, and if normal counts are not restored within ten days the certificate shall be suspended.

59. Bacterial counts shall be made at least once a week.

60. **Collection of Samples.**—The samples to be examined shall be obtained from milk as offered for sale and shall be taken by a representative of the Milk Commission. The samples shall be received in the original packages, in properly iced containers, and they shall be so kept until examined, so as to limit, as far as possible, changes in their bacterial content.

61. For the purpose of ascertaining the temperature, a separate original package shall be used, and the temperature taken at the time of collecting the sample, using for the purpose a standardized thermometer graduated in the centigrade scale.

62. **Interval between Milking and Plating.**—The examinations shall be made as soon after collection of the samples as possible, and in no case shall the interval between milking and plating the samples be longer than forty hours.

63. **Plating.**—The packages shall be opened with aseptic precautions after the milk has been thoroughly mixed by vigorously reversing and shaking the container twenty-five times.

64. Two plates, at least, shall be made for each sample of milk, and there shall also be made a control of each lot of medium and apparatus used at each testing. The plates shall be grown at 37° C. for forty-eight hours.

65. In making the plates there shall be used agar agar media containing 1.5 per cent agar and giving a reaction of 1.0 to phenolphthalein.

The following is the method recommended by a committee of the American Public Health Association for the making of the media, modified, however, as to the agar content and reaction to conform to the requirements specified in Section 65:

(1) Boil 15 grams of thread agar in 500 c. c. of water for half an hour and make up weight to 500 g. or digest for ten minutes in the autoclave at 110° C. Let this cool to about 60° C.

(2) Infuse 500 g. finely chopped lean beef for twenty-four hours with its own weight of distilled water in the refrigerator.

(3) Make up any loss by evaporation.

(4) Strain infusion through cotton flannel, using pressure.

(5) Weigh filtered infusion.

(6) Add Witte's peptone 2%.

(7) Warm on water bath, stirring until peptone is dissolved and not allowing temperature to rise above 60° C.

(8) To the 500 grams of meat infusion (with peptone) add 500 g. of the 2% agar, keeping the temperature below 60° C.

(9) Heat over boiling water (or steam) bath thirty minutes.

(10) Restore weight lost by evaporation.

(11) Titrate after boiling one minute to expel carbonic acid.

(12) Adjust reaction to final point desired 1. by adding normal sodium hydrate.

(13) Boil two minutes over free flame, constantly stirring.

(14) Restore weight lost by evaporation.

(15) Filter through absorbent cotton or coarse filter paper, passing the filtrate through the filter repeatedly until clear.

(16) Titrate, and record the final reaction.

(17) Tube (10 c. c. to a tube) and sterilize in autoclave one hour at fifteen pounds pressure, or in the streaming steam for twenty minutes on three successive days.

66. Samples of milk for plating shall be diluted in the proportion of one part of milk to 99 parts of sterile water; shake twenty-five times and plate 1 c. c. of the dilution.

The Committee on Bacterial Milk Analyses of the American Public Health Association in Part IV of its report presented details with respect to plating, apparatus, and technique, in part, as follows:

Plating Apparatus.—For plating it is best to have a water bath in which to melt the media, and a water-jacketed water

bath for keeping it at the required temperature; a wire rack, which should fit both the water baths, for holding the media tubes; a thermometer for recording the temperature of the water in the water-jacketed bath, sterile one c. c. pipettes, sterile petri dishes, and sterile dilution water in measured quantities.

Dilutions.—Ordinary potable water, sterilized, may be used for dilutions. Occasionally spore forms are found in such water which resist ordinary autoclave sterilization; in such cases, distilled water may be used or the autoclave pressure increased. With dilution water in eight-ounce bottles calibrated for ninety-nine cubic centimeters, all the necessary dilutions may be made.

Short, wide-mouthed "Blakes" or wide-mouthed, French square bottles are more easily handled and more economical of space than other forms of bottles or flasks.

Eight-ounce bottles are the best, as the required amount of dilution water only about half fills them, leaving room for shaking. Longifibre, non-absorbent cotton should be used for plugs. It is well to use care in selecting cotton for this purpose to avoid short fibre or dusty cotton, which gives a cloud of lint-like particles on shaking. Bottles . . . should be filled a little over the 99 c. c. . . . to allow for loss during sterilization.

Pipettes.—Straight sides, 1 c. c. pipettes are more easily handled than those with bulbs; they may be made from ordinary 3/16 inch glass tubing, and should be about ten inches in length.

Plating technique.—The agar after melting should be kept in the water-jacketed water bath between 40° C. and 45° C. for at least fifteen minutes before using, to make sure that the agar itself has reached the temperature of the surrounding water. If used to warm, the heat may destroy some of the bacteria or retard their growth.

Shake the milk sample twenty-five times, then with a sterile pipette transfer 1 c. c. to the first dilution water and rinse the pipette by drawing dilution water to the mark and expelling; this gives a dilution 1 to 100.

X X X Then with a sterile pipette transfer 1 c. c. to the Petri dish, using care to raise the cover only as far as necessary to insert the end of the pipette.

Take the tube of agar from the water bath, wipe the water from outside the tube with a piece of cloth, remove the plug, pass the mouth of the tube through the flame, and pour the agar into the plate, using the same care as before to avoid exposure of the plate contents to the air.

Carefully and thoroughly mix the agar and diluted milk in the Petri dish by a rotary motion, avoiding the formation of

air bubbles or slopping the agar, and after allowing the agar to harden for at least fifteen minutes at room temperature, place the dish bottom down in the incubator.

Plating should always be done in a place free from dust or currents of air.

In order that colonies may have sufficient food for proper development, 10 c. c. of agar shall be used for each plate.

67. **Determination of Taste and Odor of Milk.**—After the plates have been prepared and placed in the incubator, the taste and odor of the milks shall be determined after warming the milk to 100° F.[3]

68. **Counts.**—The total number of colonies on each plate should be counted, and the results expressed in multiples of the dilution factor. Colonies too small to be seen with the naked eye or with slight magnification shall not be considered in the count.

69. **Records of Bacteriologic Tests.**—The results of all bacterial tests shall be kept on file by the secretary of each Commission, copies of which should be made available annually for the use of the American Association of Medical Milk Commissions.

Chemical Standards and Methods.

The methods that must be followed in carrying out the chemical investigations essential to the protection of Certified Milk are so complicated that in order to keep the fees of the chemist at a reasonable figure, there must be eliminated from the examination those procedures which, whilst they might be helpful and interesting, are in no sense necessary.

For this reason the determination of the water, the total solids and the milk sugar is not required as a part of the routine examination.

70. The chemical analyses shall be made by a competent chemist designated by the Medical Milk Commission.

71. **Method of Obtaining Samples.**—The samples to be examined by the chemist shall have been examined previously by the bacteriologist designated by the Medical Milk Commission as to temperature, odor, taste, and bacterial content.

[3] Should it be deemed desirable and necessary to conduct tests for sediment, the presence of special bacteria, or the number of leucocytes, the methods adopted by the committees of the American Public Health Association should be followed.

72. **Fat Standards.**—The fat standard for Certified Milk shall be 4%, with a permissible range of variation of from 3.5% to 4.5%.

73. The fat standard for Certified Cream shall be not less than 18%.

74. If it is desired to sell higher fat percentage milks or creams as Certified Milks or Creams, the range of variation for such milks shall be .5% on either side of the advertised percentage, and the range of variations for such creams shall be 2.00 per cent on either side of the advertised percentage.

75. The fat content of Certified Milks and Creams shall be determined at least once each month.

76. The methods recommended for this purpose are The Babcock (a), The Leffman-Beam (b), and The Gerber (c):

(a) *The Babcock Test*:—The Babcock test is based on the fact that strong sulphuric acid will dissolve the non-fatty solid constituents of milk, and thus enable the fat to separate on standing. It can be conducted by any of the Babcock outfits which are purchasable in the market. "The test is made by placing in the special test bottle 18 grams (17.6 c. c.) of milk. To this is added, from a pipette, burette, or measuring bottle, 17.5 c. c. commercial sulphuric acid of a specific gravity of 1.82 to 1.83. The contents of the bottle are carefully and thoroughly mixed by a rotary motion. The mixture becomes brown, and heat is generated. The test bottle is now placed in a properly balanced centrifuge and whirled for five minutes at a speed of from 800 to 1,200 revolutions per minute. Hot water is then added to fill the bottle to the lower part of the neck, after which it is again whirled for two minutes. Now, enough hot water is added to float the column of fat into the graduated portion of the neck of the bottle, and the whirling is repeated for a minute. The amount of fat is read while the neck of the bottle is still hot. The reading is from the upper limits of the meniscus. A pair of calipers is of assistance in measuring the column of fat."—Jensen's Milk Hygiene (Leonard Pearson's Translation).

(b) *The Leffman-Beam Test*:—The distinctive feature is the use of fusel oil, the effect of which is to produce a greater difference in surface tension between the fat and the liquid in which it is suspended, and thus promote its readier separation.

This effect has been found to be heightened by the presence of a small amount of hydrochloric acid.

The test bottles have a capacity of about 30 c. c. and are provided with a graduated neck, each division of which represents 9.1 per cent by weight of butter fat.

Fifteen c. c. of the milk are measured into the bottle, 3 c. c. of a mixture of equal parts of amyl alcohol and strong hydrochloric acid added and mixed. Then 9 c. c. of concentrated sulphuric acid is added in portions of about 1 c. c.; after each addition the liquids are mixed by giving the bottle a gyratory motion. If the fluid has not lost all of its milky color by this treatment, a little more concentrated acid must be added. The neck of the bottle is now immediately filled to about the zero point with one part sulphuric acid and two parts water, well mixed just before using. Both the liquid in the bottle and the diluted acid must be hot. The bottle is then placed at once in the centrifugal machine; after rotation from one to two minutes, the fat will collect in the neck of the bottle and the percentage may be read off.

(c) *Gerber's Test*:—This test is applied as follows: The test-bottles are put into the stand with the mouths uppermost; then, with the pipette designed for the purpose or with an automatic measurer, 10 c. c. of sulphuric acid are filled into the test-bottle, care being taken not to allow any to come in contact with the neck. The few drops remaining in the tip of the pipette should not be blown out. Then 11 c. c. of the milk are measured with the proper pipette and allowed to flow slowly on to the acid, so that the two liquids mix as little as possible. Finally, the amyl alcohol is added, (it is important to use the reagents in the proper order, which is—sulphuric acid, milk, amyl alcohol. If the sulphuric acid is followed by amyl alcohol and the milk last, then the result is sometimes incorrect.) A rubber stopper, which must not be damaged, is then fitted into the mouth of the test-bottle, and the contents well shaken, the thumb being kept on the stopper to prevent it coming out. As a considerable amount of heat is generated by the action of the sulphuric acid on the milk, the test-bottle should be wrapped in a cloth.

The shaking of the sample must be done thoroughly and quickly, and the test-bottle inverted several times, so that the liquid in the neck becomes thoroughly mixed. By pressing in the rubber stopper, the height of the liquid can be brought to about the zero point on the scale.

If only a few samples have to be analyzed and the room is

warm, the test-bottles can be put into the centrifuge without any preliminary heating; otherwise the test-bottles must be warmed for a few minutes (not longer) in the water-bath at a temperature 60° to 65° C. When the temperature rises higher than this, say above 70° C., the rubber stopper is liable to be blown out of the test-bottle. After the test-bottles have been heated they are arranged symmetrically in the centrifuge and whirled for three to four minutes at a speed of about one thousand revolutions per minute. When the centrifuge has a heating arrangement attached to it, the preliminary warning is not, of course, necessary. When the test-bottles are taken out of the centrifuge they are again placed in the water-bath at a temperature of 60° C. to 65° C., and left there for several minutes before being read; where the centrifuge is heated, the tubes can be read off as taken from the centrifuge.

By carefully screwing in the rubber stopper, or even by pressing it, the lower limit of the fat column is brought on to one of the main divisions of the scale, and then, by holding the test-bottle against the light, the height of the column of fat can be accurately ascertained. The lowest point of the meniscus is taken as the level when reading the upper surface of the fat in a sample of whole milk, and the middle of the meniscus for separated milk.

If the column of fat is not clear and sharply defined, the sample must be again whirled in the centrifuge.

Each division on the scale is equivalent to 0.1 per cent, so it is very easy to read to 0.05 per cent, or, with a lens, to 0.025 per cent. If the number which is read off is multiplied by 0.1, then the percentage quantity of fat in the milk is obtained; that is, if the number on the scale was 36.5, then the percentage of fat is 3.65 per cent.—Milk and Dairy Products—Barthel, translated by Goodwin—p. 71.

77. Before condemning samples of milk which have fallen outside the limits allowed, the chemist shall have determined, by control ether extractions, that his apparatus and his technique are reliable.

78. **Protein Standard.**—The protein standard for Certified Milk shall be 3.50 per cent with a permissible range of variation of from 3.00 to 4.00 per cent.

79. The protein standard for Certified Cream shall correspond to the protein standard for Certified Milk.

80. The protein content shall be determined only when any

special consideration seems to the Medical Milk Commission to make it desirable.

81. It shall be determined by the Kjeldahl method, using the Gunning or some other reliable modification, and employing the factor 6.25 in reckoning the protein from the nitrogen.

Kjeldahl Method.—Five c. c. of milk are measured carefully into a flat-bottom 800 c. c. Jena flask; 20 c. c. of concentrated sulphuric acid (C. P.; sp. Gr., 1.84) are added, and .7 gram of mercuric oxid (or its equivalent in metallic mercury); the mixture is then heated over direct flame until it is straw-colored or perfectly white; a few crystals of potassium permanganate are now added till the color of the liquid remains green. All the nitrogen in the milk has then been converted into the form of ammonium sulphate. After cooling, 200 c. c. of ammonia-free distilled water are added, 20 c. c. of a solution of potassium sulphide (containing 40 grams sulphite per liter), and a fraction of a gram of powdered zinc. A quantity of semi-normal Hal-solution, more than sufficient to neutralize the ammonia obtained in the oxidation of the milk, is now carefully measured out from a delicate burette (divided into 1/20 c. c.) into an Erlenmeyer flask, and the flask connected with a distillation apparatus. At the other end, the Jena flask containing the watery solution of the ammonium sulphate is connected, after adding 50 c. c. of a concentrated soda solution (1 pound "pure potash" dissolved in 500 c. c. of distilled water and allowed to settle); the contents of the Jena flasks are now heated to boiling, and the distillation is continued for forty minutes to an hour, until all ammonia has been distilled over.

The excess of acid in the Erlenmeyer receiving-flask is then accurately titrated back by means of a tenth-normal standard ammonia solution, using a cochineal-solution as an indicator. From the amount of acid used, the per cent of nitrogen is obtained; and from it, the per cent of casein and albumen in the milk by multiplying by 6.25. The amount of nitrogen contained in the chemicals used is determined by blank experiments and deducted from the nitrogen obtained as described.—Farrington and Woll, Testing Milk and Its Products, p. 221.

82. **Coloring Matter and Preservatives.**—All Certified Milks and Creams shall be free from adulteration, and coloring matter and preservatives shall not be added thereto.

83. Tests for the detection of added coloring matter shall

be applied whenever the color of the milk or cream is such as to arouse suspicion.

Test for Coloring Matter.—The presence of foreign coloring matter in milk is easily shown by shaking 10 c. c. of the milk with an equal quantity of ether; on standing, a clear ether solution will rise to the surface; if artificial coloring matter has been added to the milk, the solution will be yellow colored, the intensity of the color indicating the quantity added; natural fresh milk will give a colorless ether solution.—Testing Milk and Its Products—Farrington and Woll, p. 244.

84. Tests for the detection of formaldehyde, borax, and boracic acid shall be applied at least once each month. Occasionally, application of tests for the detection of salicylic acid, benzoic acid, and the benzoates are also recommended.

Test for the Detection of Formaldehyde: Five c. c. of milk is measured into a white porcelain dish, and a similar quantity of water added. Ten c. c. of HCL containing a trace of Fe_2Cl_6 is added, and the mixture is heated very slowly. If formaldehyde is present, a violet color will be formed.—Testing Milk and Its Products—Farrington and Woll, p. 249.

Test for Boracic Acid (borax, borates, preservaline, etc.)—One hundred c. c. of milk are made alkaline with a soda or potash solution, and then evaporated to dryness and incinerated. The ash is dissolved in water to which a little hydrochloric acid has been added, and the solution filtered. A strip of turmeric paper moistened with the filtrate will be colored reddish brown when dried at 100° C. on a watch glass, if boracic acid is present.

If a little alcohol is poured over the ash to which concentrated sulphuric acid has been added, and fire is set to the alcohol, after a little while this will burn with a yellowish green tint, especially noticeable if the ash is stirred with a glass rod and when the flame is about to go out.—Testing Milk and Its Products—Farrington and Woll, p. 247.

Test for Salicylic Acid (*salicylates, etc.*):—Twenty c. c. of milk are acidulated with sulphuric acid and shaken with ether; the ether solution is evaporated, and the residue treated with alcohol and a little iron-chlorid solution; a deep violet color will be obtained in the presence of salicylic acid.—Testing Milk and Its Products—Farrington and Woll, p. 249.

Test for Benzoic Acid:—Two hundred and fifty to five hundred c. c. of milk are made alkaline with a few drops of lime

or baryta water, and then evaporated to about a quarter of the bulk. Powdered gypsum is stirred into the remaining liquid until a paste is formed, which is then dried on the water-bath. The gypsum only serves to hasten the drying, and powdered pumice stone or sand can be used equally well. When the mass is dry, it is finely powdered and moistened with dilute sulphuric acid and shaken out three or four times with about twice the volume of 50% alcohol, in which benzoic acid is easily soluble in the cold, the fat only being dissolved to a very slight extent or not at all. The acid alcoholic liquid from the various extractions, which contains milk sugar and inorganic salts in addition to the benzoic acid, is neutralized with baryta water and evaporated to a small bulk. Dilute sulphuric acid is again added, and the liquid shaken out with small quantities of ether. On evaporation of the ether, the benzoic acid is left behind in almost pure state, the only impurities being small quantities of fat or ash.

The benzoic acid which is obtained is dissolved in a small quantity of warm water, a drop of sodium acetate and neutral ferric chloride added, and the red precipitate of benzoate of iron indicates the presence of the acid.—Milk and Dairy Products—Barthel, Translated by Goodwin, p. 121.

85. **Detection of Heated Milk.**—Certified Milk or Cream shall not be subjected to heat unless specially directed by the Commission to meet emergencies.

86. Tests to determine whether such milks and creams have been subjected to heat shall be applied at least once each month.

Detection of Heated Milk—Storch's method:—Five c. c. of milk are poured into a test tube; a drop of weak solution of hydrogen dioxide (about 0.2 per cent), which contains about 0.1 per cent sulphuric acid, is added, and two drops of a two per cent solution of paraphenylendiamin (solution should be renewed quite often), then the fluid is shaken. If the milk or the cream becomes at once indigo blue, or the whey violet or reddish brown, then this has not been heated or, at all events, it has not been heated higher than 78° C. (172.5° F.); if the milk becomes a light bluish gray immediately or in the course of half a minute, then it has been heated to 79° to 80° C. (174.2° to 176° F.). If the color remains white, the milk has been heated at least to 80° C. (176° F.). In the examination of sour milk or sour butter milk, lime water must be added, as the color reaction is not shown in acid solution.

Arnold's guaiac method:—A little milk is poured into a test tube and a little tincture of guaiac is added, drop by drop. If the milk has not been heated to 80° C. (176° F.) a blue zone is formed between the two fluids; heated milk gives no reaction, but remains white. The guaiac tincture should not be used perfectly fresh, but should have stood a few days and its potency have been determined. Thereafter it can be used indefinitely. (These tests for heated milk are only active in the case of milks which have been heated to 176° F. or 80° C.)—Jensen's Milk Hygiene—Pearson's translation, p. 192.

Microscopic Test for Heated (Pasteurized) Milk—Frost and Ravenel—About fifteen c. c. of milk are centrifuged for five minutes, or long enough to throw down the leucocytes. The cream layer is then completely removed with absorbent cotton, and the milk drawn off with a pipette, or a five-pointed tube attached to a Chapman air pump. Only about two m. m. of milk are left above the sediment which is in the bottom of the sedimentation tube.

The stain, which is an aqueous solution of salfranin O, soluble in water, is then added very slowly from an opsonizing pipette. The important thing is to mix stain and milk so slowly that clotting does not take place. The stain is added until a deep, opaque rose color is obtained. After standing three minutes, by means of the opsonizing pipette, which has been washed out in hot water, the stained sediment is then transferred to slides. A small drop is placed at the end of each of several slides and spread by means of a glass spreader, as in Wright's method for opsonic index determinations.

In an unheated milk the poly-morpho-nuclear leucocytes have their protoplasm slightly tinged or are unstained.

In heated milk the poly-morpho-nuclear leucocytes have their nuclei stained. In milk heated to 63° C. or above, practically all of the leucocytes have their nuclei definitely stained. When milk is heated at a lower temperature the nuclei are not all stained above 60° C., however, the majority are stained.

87. **Specific Gravity.**—The specific gravity of Certified Milk shall range from 1,029 to 1,034.

88. The specific gravity shall be determined at least each month.

The Quevenne lactodensimeter is recommended for the determination of the specific gravity. It is made like an ordinary aerometer and divided into degrees which correspond to a specific

gravity from 1.014 to 1.040, or only from 1.022 to 1.038, since, by the latter division, a greater space is gained between the different degrees, without unduly lengthening the instrument. From such a lactodensimeter one can easily read off four decimal places.

The milk whose specific gravity is to be determined is well shaken and poured into a high glass cylinder of suitable diameter; the aerometer is dropped in slowly, in order to prevent its bobbing up and down. (The bulb should be free from adhering air bubbles.) The figures on the stem are the second and third decimals of the numbers of the specific gravity, so that 34 is to be read 1.034. For this examination, the temperature of the milk must be 15° C. (60° F.); if it is not, the specific gravity of the milk at 15° C. must be calculated from the specific gravity found and from the temperature, for in milk inspection and analysis this is the standard.

Methods and Regulations for the Medical Examination of Employees, Their Health and Personal Hygiene.

89. A medical officer, known as the attending dairy physician, shall be selected by the Commission, who should reside near the dairy producing Certified Milk. He shall be a physician in good standing and authorized by law to practice medicine; he shall be responsible to the Commission and subject to its direction. In case more than one dairy is under the control of the Commission and they are in different localities, a separate physician shall be designated for employment for the supervision of each dairy.

90. Before any person shall come on the premises to live and remain as an employee, such person, before being engaged in milking or the handling of milk, shall be subjected to a complete physical examination by the attending physician. No person shall be employed who has not been vaccinated recently, or who, upon examination, is found to have a sore throat or to be suffering from any form of tuberculosis, venereal disease, conjunctivitis, diarrhea, dysentery, or who has recently had typhoid fever or is proved to be a typhoid carrier, or who has any inflammatory disease of the respiratory tract, or any suppurative process or infectious skin eruption, or any disease of an in-

fectious or contagious nature, or who has recently been associated with children sick with contagious disease.

91. In addition to ordinary habits of personal cleanliness, all milkers shall have well-trimmed hair, wear close-fitting caps, and have clean shaven faces.

92. When the milkers live upon the premises, their dormitories shall be constructed and operated according to plans approved by the Commission. A separate bed shall be provided for each milker, and each bed shall be kept supplied with clean bed-clothes. Proper bathing facilities shall be provided for all employees on the dairy premises, preferably a shower bath, and frequent bathing shall be enjoined.

93. In case the employees live on the dairy premises, a suitable building shall be provided to be used only for the isolation and quarantine of persons under suspicion of having a contagious disease.

The following plan of construction is recommended: The quarantine building and hospital should be one story high and contain at least two rooms, each with a capacity of about 6,000 cubic feet and containing not more than three beds; the rooms to be separated by a closed partition. The doors opening into the rooms should be on opposite sides of the building and provided with locks. The windows should be barred and the sash should be at least five feet from the ground, and constructed for proper ventilation. The walls should be of a material which will allow proper disinfection. The floor should be of painted or washable wood, preferably of concrete, and so constructed that the floor may be flushed and properly disinfected. Proper heating, lighting, and ventilating facilities should be provided.

94. In the event of any illness of a suspicious nature, the attending physician shall immediately quarantine the suspect, notify the health authorities and the secretary of the Commission, and examine each member of the dairy force; and in every inflammatory affection of the nose or throat occuring among the employees of the dairy, in addition to carrying out the above mentioned program, the attending physician shall take a culture and have it examined at once by a competent bacteriologist approved by the Commission. Pending such examination, the affected employee or employees shall be quarantined.

95. It shall be the duty of the secretary, on receiving notice of any suspicious or contagious disease at the dairy, at once to notify the committee having in charge the medical supervision of employees of the dairy farm upon which such disease has developed. On receipt of the notice, this committee shall assume charge of the matter, and shall have power to act for the Commission as its judgment dictates. As soon as possible thereafter, the committee shall notify the Commission, through its secretary, that a special meeting may be called for ultimate consideration and action.

96. When a case of contagious disease is found among the employees of a dairy producing Certified Milk under the control of a Medical Milk Commission, such employee shall be at once quarantined, and as soon as possible removed from the plant, and the premises fumigated.

When a case of contagion is found on a certified dairy, it is advised that a printed notice of the facts shall be sent to every householder using the milk, giving in detail the precautions taken by the dairyman under the direction of the Commission, and it is further advised that all milk produced at such dairy shall be heated at 140° F. for forty minutes, 155° F. for thirty minutes, or 167° F. for twenty minutes, or 190° F. for one minute, and immediately cooled to 50° F. These facts should also be part of the notice, and such heating of the milk should be continued during the accepted period of incubation for such contagious disease.

The following method of fumigation is recommended: After all windows and doors are closed and the cracks sealed by strips of paper applied with flour paste, and the various articles in the room so hung or placed as to be exposed on all sides, preparations should be made to generate formaldehyde gas by the use of twenty ounces of formaldehyde and ten ounces of permanganate of potash for every one thousand cubic feet of space to be disinfected.

For mixing the formaldehyde and potassium permanganate a large galvanized iron pail or cylinder holding at least twenty quarts and having a flared top should be used for mixing therein twenty ounces of formaldehyde and ten ounces of permanganate. The pails should be placed about in the rooms and the necessary quantity of permanganate weighed and placed in them. The formaldehyde solution for each pail should then be measured

into a wide-mouthed cup and placed by the pail in which it is to be used.

Although the reaction takes place quickly, by making preparations as advised all of the pails can be set off promptly by one person, since there is nothing to do but pour the formaldehyde solution over the permanganate. The rooms should be kept closed for four hours. As there is slight danger of fire, the reaction should be watched through a window or the pails placed on a non-inflammable surface.

97. Following a weekly medical inspection of the employees, a monthly report shall be submitted to the secretary of the Medical Milk Commission on the same recurring date by the examining visiting physician.

The following schedule, filled out in writing and signed by himself, is recommended as a suitable form for the attending physician's report:

This is to certify that, on the dates below indicated, official visits were made to the ..... dairy, owned and conducted by .....of..... (indicating town and state), where careful inspections of the dairy employees were made.

(a) Number and dates of visits since last report .....
.....

(b) Number of men employed on the plant .....
.....

(c) Has a recent epidemic of contagion occurred near the dairy, and what was its nature and extent? .....
.....

(d) Have any cases of contagious or infectious disease occurred among the men since the last report? .....
.....

(e) Disposition of such cases .....
.....

(f) What individual sickness has occurred among the men since the last report? .....
.....

(g) Disposition of such cases .....
.....

(h) Number of employees now quarantined for sickness....
.....

(i) Describe the personal hygiene of the men employed for milking, when prepared for, and during the process of milking .....

(j) What facilities are provided for sickness in employees? .....

(k) General hygienic condition of the dormitories or houses of the employees .....

.....

(l) Suggestions for improvement .....

.....

(m) What is the hygienic condition of the employees and their surroundings? .....

.....

(n) How many employees were examined at each of the foregoing visits? .....

.....

(o) Remarks .....

.....

Signed .....

Attending Physician.

Date .....

DISCUSSION.

Dr. M. P. Ravenel, Madison, Wisconsin: "I would suggest that, instead of specifying the number of diameters or distance of the lens, I would make every one use the same lens and make it a four-time magnification."

Dr. T. C. McCleave, Berkeley, California: "To that section of the report which provides that 'Certified Milk shall not be subjected to heat,' I think should be added the clause, 'unless by direction of the Commission to meet temporary emergencies.' This is intended to provide for times when, because of an outbreak of scarlet fever or other contagious diseases among farm employees, it might be deemed advisable to Pasteurize the milk from that farm. The paragraph with reference to milking, which provides that when dirt accidentally gets into the pail the milk shall be rejected and the pail washed

before being used, I think should read, 'sterilized before being used.' "

Dr. Ben Carlos Frazier, Louisville, Kentucky: "I would suggest that sixteen per cent butter fat in cream is a rather low percentage."

Dr. Harris Moak, Brooklyn, New York: "The section of the report which provides that the cap of the bottle shall bear the date of production affects just one half of the sources of Certified Milk supply of the cities of New York and Brooklyn, in this way: For instance, this evening's milk and to-morrow morning's milk will be loaded on the train to-morrow, shipped to the city, and sold the following day. To-day is the 30th of April; to-morrow will be May 1, and the milk of both days will be sold on May 2 in New York and Brooklyn. We had this question up and decided that it is too misleading and confusing to the consumer to deliver on May 2 a bottle of milk dated April 30 to one person, and a bottle dated May 1 to another. They will naturally think there is something wrong somewhere. Our nearest dairy is sixty miles from the city, and the others range in distance up to two hundred and sixty-five miles, and every bit of our milk is from twenty-four to thirty-six hours old when it gets to the city. To obviate this, we have, for a number of years, printed on our caps the words "Date to be sold, ——." The blank was formerly filled in with the day of the month, but for a year or more we have simply inserted the day of the week. The report provides that the milk must be sold on the day following the milking. That would be impossible for us. Therefore, I would suggest that the clause of the report to which I have referred be changed so as to provide that the milk shall bear the date upon which it is to be sold.

"In regard to the aeration of the milk, this bears directly upon what I said this morning—our best results are obtained at dairies where aeration is not employed. I believe that if we are obliged to practice aeration at all of our dairies, it would be a change to the detriment of our milk. I think the word 'may,' instead of 'shall,' should be used in this clause.

"Regarding tuberculin testing, we in New York State operate pretty carefully under a State law that is rather strict as to who shall make the tests, how they shall be made, what tuberculin shall be used, etc., and we have just as much confidence in Cornell University tuberculin as we have in that produced by the Government. Therefore, I think the wording of the report should be changed in this respect, or a clause added to the effect that these methods and standards shall be adopted in so far as they do not conflict with State laws or city ordinances governing milk production.

"In regard to butter fat, these rules provide that the milk shall contain an average of four per cent butter fat, with a leeway of from three and one-half to four and one-half per cent. It is easier and cheaper to produce milk with a low percentage of butter fat than a high one, and it seems to me that, under these rules, the producer could easily comply with the minimum percentage of butter fat by giving an occasional sample that would show four or four and one-half per cent butter fat, but the great bulk of the milk would be three and one-half per cent.. I believe that the milk should average four per cent over any reasonable period—say ninety days. If you give a leeway, it will be taken advantage of, because it means dollars and cents to the producer. Perhaps the insertion of the word 'average' would fix it up all right.

"In regard to the section providing that weekly examination shall be made of employees, that would necessitate the services of nine or ten physicians, one located near each of the various dairies under our supervision, and would greatly increase the expense of certification of milk."

Dr. Henry L. Coit, Newark, New Jersey: "What provision do you now make for the examination of employees on your farms?"

Dr. Harris Moak, Brooklyn, New York: "I go over the farms myself and look after the men as far as I am able to do so. Furthermore, the product of every farm is marked, so that, in the event of any trouble with the milk, such as carrying infection, etc., the farm on which it originates can be

specifically located. Moreover, we require a weekly postal report from every farm, with especial regard to contagious or infectious diseases."

Dr. Henry L. Coit, Newark, New Jersey: "Referring to Dr. Moak's remarks concerning the clause which makes four per cent the standard of butter fat, with a variation of one-half per cent either way, I will say that Dr. Hamill is responsible for this clause. I criticised it myself, but Dr. Hamill has some very important reasons for fixing the minimum at three and one-half per cent, one of which, I believe, is in order not to exclude certain milks which are well up to the standard except as to the percentage of butter fat, which would not preclude its use by the clinician, because milk with a high percentage of butter fat is not as useful, under certain conditions, as one with a lower percentage."

Dr. Otto P. Geier, Cincinnati, Ohio: "It seems that Dr. Moak misunderstood the section providing for medical examinations of employees. The rules state that such examinations shall be made monthly—not weekly."

Dr. J. W. Van Derslice, Chicago, Illinois: "First, I would like to know whether the adoption of this report means that every Commission will have to live up to these rules, or whether they are intended to represent the ideal toward the attainment of which all Commissions should strive? This is a very important question, because it seems to me that it would be almost a physical impossibility for the average Commission to live up to some of these rules. I think the rule providing for a separate cloth for each cow would simply be something for the Commission to see how easily it could be broken. I do not think any one would try to live up to it. I would like to emphasize Dr. Moak's criticism in regard to aeration. It seems to me that the word 'aeration' has been rather carelessly used in place of the word 'cooling.' Therefore, I would suggest that the word 'cooling' be substituted for 'aeration.' Let each Commission decide which method it will adopt. Another thing is that the rules with respect to

the cap virtually throws out the Crown cap and seal, which has already been adopted by many Commissions.

"I would make the same criticism as Dr. Moak in regard to the twenty-four-hour period. Some of our firms are so situated geographically that they cannot get the night's milk to the city in time for the morning delivery. Unless the milk reaches the city by twelve o'clock, midnight, it cannot be delivered the next morning. It is a physical impossibility; the milk cannot reach Chicago in time to be distributed the next morning. These firms have been supplying Certified Milk for years, and I am sure that the Chicago Medical Milk Commission could not consistently refuse to certify their product simply because of a change in the rules adopted by this Association.

"I also object to the section in regard to tuberculin testing. The report says that the tests shall be made at fixed dates. I am sure that the average reader would say that, according to this, the date must be a fixed one and not changed from year to year. I do not know of anything that would give a dairyman a better opportunity to plug his cattle, if he were so inclined. If we announce that the test will be made on a given date, every well-meaning farmer could have every one of his cows free from tuberculosis.

"One thing that occurs to me is the question of epidemic abortion, which is not specifically mentioned in the report."

Dr. John W. Kerr, Washington, D. C.: "We have made provision for that in the section which provides that the dairyman shall notify the Commission immediately upon the appearance of any epidemic. Furthermore, in addition to the diseases specifically mentioned, we have used the words 'and other infectious diseases.'"

Dr. J. W. Van Derslice, Chicago, Illinois: "In regard to the percentage of butter fat, I do not believe in giving over one tenth of one per cent leeway on either side. We have two or three farms whose product in three years has not varied one tenth of one per cent above or below four per cent. We certify three grades of milk. I think we should limit the

spread, but I do not believe we have any right to change the old standard of three and one-half to five and one-half per cent. We have accepted farms under the old standard, fixing the limit of spread for each individual farm. Can we say to the owner of a pure-bred Holstein herd that we cannot certify his product any longer? Holsteins give milk which runs about 3.75 per cent butter fat, and while I do not believe we should lower the standard much below that figure, still I do not believe it would be taking a logical stand to throw out of the certified ranks a breed of cattle that furnish the people of the United States with more of their milk than any other two or three breeds combined. Furthermore, in attempting to do so you are going up against one of the biggest organizations of cattle producers in the country.

"I also object very seriously to the percentage of fat being placed on the cap. I think the medical man should know the percentage of fat he is prescribing, and we have carried out this idea in the Bulletin of the Chicago Medical Society, in which we have repeatedly published the fat content of the milk given by the various herds. However, the minute you put the percentage of butter fat of the milk given by the various herds on the cap of the bottle, you invite unfair competition; you are putting an unfair advantage into the hands of the most unscrupulous of persons—not the dairyman, and possibly not the man in charge of the distributing station, but the driver. If you stamp the various percentages of butter fat on the cap, the man who delivers the milk with the highest percentage will be going right over the route of the man with the lower percentage and stealing his customers, and then there will be nothing but trouble. I believe the doctor should know—and he is the only one who should know—the fat content of the various milks.

"I am opposed to the medical inspection of farms. That may sound like a very great step backwards, but I have always been opposed to it; and the recommendation of this Committee is not sufficient to make me change my mind. We handle the proposition in this way: Employers are given

notice that there are certain types of men that they cannot hire, and we recommend a certain grade of men—married rather than single—men who can have homes or cottages on the farms rather than bunk houses. The men are expected to be asked certain questions regarding previous health, present health, etc. Every two weeks we send to the farmer a postcard, and on that card we inquire as to the health of all employees and their families, and the health of the community in general. At certain times of the year, when respiratory disorders are most prevalent, we send them a special notice, telling them that any man with a sore throat or a simple cold must not come in contact with the milk; he shall neither act as milker, or in any capacity in the milk and dairy houses. We have felt that it is better to put the question of looking after the health of employees up to the farmer, rather than to place the responsibility upon the Commission. For instance, if we accept the responsibility of seeing that the health of employees is what it ought to be at all times, then if an epidemic should occur that could be traced to a particular farm, the farmer could come back at us—we would be the responsible parties. Therefore, we have put it up to the farmer in this way: 'If an epidemic occurs that can be traced to your farm, it means loss of certification of your product.' Furthermore, I can see no reason why the recommendations made by this Committee would not greatly increase the cost of certification. For an examination such as outlined in this report, it would be necessary to pay at least as much as insurance companies pay for an examination which is not nearly so comprehensive. The help on a dairy farm is anything but stable; changes are frequently made, and it would be necessary to have a physician in the neighborhood to whom the men could go to be examined. I have no doubt that, at say five dollars an examination, the cost on a large farm would amount to more than one hundred dollars a month for examinations alone. That would be absolutely prohibitive, and would place a tax upon the producer that we have no right to impose. That is also the reason why I feel that it would be absolutely

impossible for a small farm to live up to this part of the rules."

Dr. Ben Carlos Frazier, Louisville, Kentucky: "Dr. Van Derslice has gone into this matter in great detail, and like him, I do not believe that these rules can be lived up to."

Dr. T. C. McCleave, Berkeley, California: "Answering Dr. Frazier's remark that these rules cannot be lived up to, I want to say that these are the present rules of our Commission with the single exception of the detailed examination of employees; that is the only change we would have to make. Personally, I agree that the detailed examinations of employees as outlined in the report is almost an impossibility. If the recommendation is followed, we would have to make throat smears, cultures from the nose, examinations of feces, etc., and I think that is out of the question. However, in every other respect I am sure that these requirements are perfectly practical."

Mr. W. E. Miller, Lebanon, Ohio: "It is very desirable that you get together and agree upon standards. We cannot have sixty-three kinds of Certified Milk in the United States; we must have one kind of Certified Milk. The term must mean the same on the Pacific Coast as on the Atlantic Coast, and physicians ought not to insist upon economy. Adopt one platform and let us all stand upon it. In that way the producer will be protected against unfair competition, we will know what a Milk Commission stands for, and we will know what Certified Milk is. It is very desirable, from every standpoint I can think of, that you adopt these rules."

The President: "I am sure you will all appreciate the thorough work done by this Committee. It has been read to the Council, which has approved it. It also has the approval of the American Association of Certified Milk Producers, and the Council recommends it to you for adoption."

Dr. John R. Williams, Rochester, New York: "In order to get the question properly before the house, I move that the report be adopted."

Motion seconded by Dr. T. C. McCleave.

DISCUSSION.

The President: "In order to get the various amendments suggested properly before the meeting, I would suggest that they be put in the form of motions."

Moved by Dr. T. C. McCleave that the rules be so changed as to provide that Certified Cream shall have a minimum butter fat content of eighteen per cent. Seconded and carried.

Moved by Dr. Otto P. Geier that the rules be so changed as to provide that the milk shall be sold not more than thirty-six hours after milking, instead of twenty-four hours. Seconded and carried.

Moved by Dr. T. C. McCleave that the paragraph relating to the tuberculin to be used in testing be amended by the addition of the words "under Government auspices."

Dr. John W. Kerr asked permission to change the clause reading "proper aeration to reduce the milk to a temperature of forty-five degrees," to "proper cooling,"etc. So ordered.

Moved by Dr. T. C. McCleave that, to the rule which provides that Certified Milk shall not be subjected to heat, be added the clause, "Unless specifically directed by the Commission to meet temporary emergencies," with an asterisk referring to a footnote explaining that the object of this proviso is to provide against times when, because of an outbreak of disease of a contagious or infectious nature on a farm, it may be deemed desirable to Pasteurize the milk. Seconded and carried.

Moved by Dr. Ben Carlos Frazier that, in Paragraph 37, the word "lip" be substituted for "neck." Seconded and carried.

Moved by Dr. Henry L. Coit that the rules be so changed as to permit either the date of production of the milk or the date on which it is to be sold, at the discretion of the Commission, to be placed on the cap of the bottle. Seconded and carried.

After rather lengthy discussion as to the advisability of making the rules and standards recommended by the Committee obligatory upon all Commissions, to be strictly adhered to in all respects, it was moved, by Dr. J. W. Van Derslice, "That a clause be added to the report to the effect that these rules and standards are set forth as the ideal, toward the attainment of which all Commissions shall strive, and to be followed in so far as practicable and consistent with local conditions." Seconded by Dr. Louis C. Ager.

Moved by Dr. T. C. McCleave, as a substitute for Dr. Van Derslice's motion: "That this Associaton adopt the report of the Committee as the working methods and standards of the Association, and recommend them to component Commissions to be followed as closely as possible."

Substitute accepted by Dr. Van Derslice, seconded, and duly carried.

Moved by Dr. J. J. Thomas that a vote of thanks be extended to the Committee for its strenuous work in preparing this report. Seconded and carried.

The program of the session having been concluded, the President declared the meeting adjourned until the next morning at 10 o'clock.

FOURTH SESSION.

Wednesday Morning, May 1, 1912.

The meeting was called to order at 10 o'clock by the President.

The President made a report for the House of Delegates upon the election of officers for the ensuing year, place of meeting, etc., after which the program was proceeded with as follows:

BACTERIA COUNT OF MILK GROWN ON MEDIA OF DIFFERENT REACTIONS.

Leon K. Baldauf, A.B., M.D.
University of Louisville, Kentucky.

This investigation was undertaken at the suggestion of Dr. Henry Tuley. Its object was to determine the more favorable temperature, 20° or 37° C., and the reaction most suitable for the growth of milk bacteria. The medium was a 1.5% agar, cleared with albumen and titrated against N/20 NaOH, phenolphthalein being used as the indicator. Batches of neutral 1% and 1½% acid agar were prepared. A 2% acid agar was unsatisfactory because, after the addition of some N/Hcl in its preparation, the medium became semi-solid and was unfit for use.

In all, fifty samples of milk from different dairies were examined. Through the kindness of Mr. Neil Roach, these samples reached the laboratory shortly after receipt, and carefully packed in ice. Milk of all fifty samples was plated on neutral and 1% acid agar, and fourteen on neutral, 1% and 1½% acid agar. Duplicate plates were made, the average being taken, and these were incubated at 37° C. acid room temperature, or as near 20° C. as possible. On the plates of media of different reactions incubated at 37° C., the maximum count of many samples was reached at end of three days. The average for the three media of different reactions being slightly greater for the 1% acid agar with some samples, however, there was a gradual increase up to the fifth day; and where the average was taken here, the plates made of media of 1½% acidity showed the larger number of colonies. On the plates incubated at 20° C., at end of twenty-four hours the number of colonies in many cases was rather small, and first counts were made at end of forty-eight hours. The number increased rapidly from day to day, and the maximum counts were reached at end of five days. Plates were never counted for more than five days. If we examine all the plates of different acidities incubated at 37° and around 20° C., we find, at the end of five days, no great difference in the number of colonies, the plates incubated at 20° C. showing, however, fewer colonies.

1. If plates incubated at 37° C. are examined at end of three days, when for many samples the maximum count is reached, we find 1% acid agar slightly the more suitable media.

2. In some samples the maximum count is reached at end of five days, and here, if average is taken, we find larger number of colonies on 1½% agar; the difference, however, is slight.

3. On plates incubated at 20° C., the count increases rapidly from day to day till the fifth day is reached.

4. The count of all plates at end of five days varies little if incubation is done at 37° C.; more so if incubation is done at 20° C., the average here being somewhat smaller.

DISCUSSION.

Dr. Henry Enbs Tuley: "It seems to me that this paper illustrates the fact that we should require uniformity of technique."

Dr. Leon K. Baldauf, Louisville, Kentucky: "Practically, I do not see that it makes much difference whether the plates are counted at the end of forty-eight or thirty-six hours, because, as a general thing, the milk has all been used in that length of time anyhow. The count depends, to a large extent, upon the sample. In certain samples of milk the maximum count was reached in twenty-four hours; in others, forty-eight hours; others, three days; and in some, five days. We know that the bacterial flora of different samples of milk vary considerably, and the conclusions reached were based upon the average of a large number of samples examined."

THE KENTUCKY METHOD OF MILK INSPECTION, AND RESULTS.

R. M. Allen, Chief, Kentucky Food and Drug Department, Lexington, Kentucky.

The Certified Milk movement has been one of the most important and life-saving in the fight for pure food. It has brought sanitary quality to the fore, with pedigrees and butter fat tests.

The certified dairies are daily experiment stations of most practical example. They are a force for pure milk, not dependent upon city ordinances or State laws. They are demonstrating, in a practical manner, the necessary facts of clean milk; that the tuberculin test is necessary and not harmful to the herds; that the bacteriological count is a necessary and accurate estimate of clean milk; that cleanliness throughout, cold, sterilization, and as little handling and time as possible between the teat of the cow and the bottle, are the rules, and that clean milk saves infant life.

For some of these reasons, recognized in 1906, I gave the fullest help toward establishing certified dairies around Louisville, and for all these reasons now, and more, the Kentucky pure food work seeks to aid the establishment and maintenance of certified dairies in every city and town of the State. The certified dairy, and its companion, the infant milk depot, are the only present desirable and practical remedies against bottle-fed mortality. Godspeed to your great, sure, life-saving movement.

Dr. Tuley and a decision from the Criminal Division of the Louisville Circuit Court, making it our legal duty, were responsible for beginning the milk sanitary work of the Kentucky Food Department. Before his appeal and the decision from the court, holding that the pure food laws had repealed the other sanitary laws relating to milk production, the inspection had been directed solely for added watering, skimming, preservatives, and coloring matter. In beginning the sanitary work, we found that Louisville, in particular, had a hundred or more of the baneful swill dairies. The County Medical Society appointed a permanent Milk Commission on which were, and still are, Drs. Thompson, Tuley, and Frazier. I have worked with many committees, in many pure food fights, but I have never known their equal, as a whole. With their daily advice and backing, a county attorney fearless in duty, and an honest magistrate, we broke up the swill dairy practice, with a hundred or more jail sentences. We followed this with sixty or more convictions for unclean milk depots and ice-boxes in retail grocery stores where milk was being kept. After this, a tramp through the dairy farms in Kentucky

was made to note the sanitary conditions and problems. This was followed by a scoring of the dairies on the Government score card, with some modifications. There were some prosecutions along with the score card inspections. Last year we re-scored and made a bacteriological count of milk from most of the Kentucky dairies, as well as the depots and retail establishments. This year the dairies are being scored, samples of water in use in washing utensils are being collected for examination, and the bacteriologists are not only making a count of the number of bacteria, but also the colon, streptococci, including a close look for typhoid. The bacteria of the B. coli group come from manure contamination. A part of the streptococci come from diseased udders; hence the importance of looking for and counting these two types. A test which gathers all the sediment from one quart of milk on a round, white piece of cotton is also a feature of this year's work, and we are finding this sediment test, together with the colon count, to be very effective in cleaning up the dairies. The fats, the solids not fat, are of course determined, and preservatives looked for. The bacteriological count is a good check for preservatives. It is unnecessary to relate to the Association the character of conditions found by this inspection, the methods, and general problems; the results being accomplished will probably be of more interest.

Although some inspection is done during the winter months, the milk work is given the first place in our plans between the first of May and the first of November of each year. Milk needs inspection, however, the year around. The force is organized with two or more sanitary inspectors to score the dairies, a sample taker, a chemist, a bacteriologist, and one or more laboratory helpers. The Bluegrass towns are worked from the main laboratory and office at Lexington. Covington, Newport, and vicinity are worked from Cincinnati, and our force is extended the courtesy of the Federal laboratory at that point. From Paducah we find it easy to reach a large section of the State; from Henderson, another section, and from Bowling Green, another section. In Louisville the work is again done in co-operation with the local City Health Department, and the inspectors

go out into all the territory to be reached from that point. It has been found practicable to fit up a field bacteriological laboratory, and this is the only method by which accurate counts can be made of milk in any part of the State, located a day and a half, by express, from the main laboratory. This field equipment also serves to illustrate as to just how easy it would be to fit up laboratories for continuous municipal work. The dairymen are brought in to see their counts; delinquent cases are reported for prosecution on the spot, and general public interest is created in a way that would not otherwise be possible. While the force is on the ground with the local health officer, they get in touch with the general council; take them out to see unclean dairies and unclean slaughtering houses; appear in the evenings, after their work is over, before the general council to explain the need for local ordinances, and to help in the enactment of model ordinances; give addresses before women's clubs, high schools, and at dairy meetings. When this work was started we were left free to make plans to suit the work. This year there are already eight or nine applications from the local health officials and citizens in various cities and towns over the State, asking for an inspection of their localities.

The Government score card, with some additions as to statistical data, and a column for inspectors to write reasons for cutting the scores, has finally been adopted as the best method for sanitary inspection. This score card contains all the items of equipment and method necessary for the conduct of a clean dairy. It contains just the information that the dairyman needs, and when this information is given, together with the equipment and conditions already in the dairyman's plant, it forms the best possible assistance that the State can offer. Accurate high scores are absolutely impossible without the sediment tests and bacteriological counts. The dairyman will answer that the udders are washed, that the milking is done with clean hands, that the cans are "scalded out," that the milk is properly cooled, that the water is clean; but when temperatures are noted, and samples of milk from the various periods of production are taken for bacteriological examination, the score is generally modified. A

very large dairy in Lexington, with all the known modern equipment, and which I personally have given a score of 99 and a fraction, without bacteriological counting, scores only 89¼ when a critical examination of methods of washing and sterilizing buckets, cans, coolers, and bottling machinery, ready for use, is made. When a score is 70 or below, however, it is possible for a careful inspector to give accurate scores with respect to methods from eye observations.

After several years of work under the standard for fats, and solids not fat, we are ready to agree with the Boston Dairy Agent, that the standard of 3.25% for fat, and 8.50% for solids not fat, has outlived its usefulness. In 1910 a large number of prosecutions were brought in Louisville for the sale of watered and skimmed milk. In all the prosecutions the sample was below the minimum standard just mentioned, and fixed under the Kentucky Food and Drugs Act, under Section 8. We lost a number of these cases before juries, because of the contention that the rain on the day when the sample was taken, or the succulent pasturage, or a Holstein cow or two in the herd may have been responsible for the low analysis. In 1911, when a dairyman was found to be selling what we believed to be watered milk, the inspector was sent to make a herd test, and in most of the sixty-five cases brought in Louisville, for example, during that year, we had evidence showing the standard of the dairyman's own herd in connection with the analysis of the milk as sold on the market. In one of these prosecutions, the sample analyzed 4.3% fat, 8.3% solids not fat; the dairyman's herd showed a fat average of a little above 5%, and solids not fat close to 9%; and the dairyman, faced with these facts, came into court and pleaded guilty. The inspectors in larger cities will say that such a method is impossible after milk has lost its identity. We have not found it impossible in Louisville, however, and when attempt is made to unravel the skein back to the original dairyman or milk depot, the method is found to be practical. This plan also affords an opportunity to prosecute the party actually responsible for the skimming or watering, which brings, of course, a stronger support from the honest and careful dealers. The broader plan for milk inspection

during the present year has already been started in Lexington. Out of about fifty regular dairies, we find some six or seven delinquents. Out of these delinquents, three or four dairies are found in which radical changes must be made, or which will be shut out once and for all. Even after finding such conditions, we still hold out hope wherever a dairyman sees a light and starts a substantial effort toward cleaning up. One dairyman in Lexington, whom we had determined to prosecute, called up one night near midnight, stating that he had just finished cleaning his milk house, that the cows would be milked on the grass lot in the morning, and that on the following day an effort would be made to put the barn into such condition as would suffice until the landlord could build a new barn. The inspector was sent to the dairy next day, found all of this cleaning-up in progress, and prosecution has been temporarily held up.

Lexington has one of the largest and most elaborately equipped dairies in the United States, and a smaller dairy that is maintaining some of the lowest counts in the country. The smaller dairy has been built up from six to twenty-two cows; the milk barn is a converted shed; the milk room is a log cabin, cut with plenty of windows, concreted, and fitted with just the necessary equipment for washing and sterilizing the utensils. Not more than three minutes of time elapse between the cow's teat and the bottle, and this dairy frequently delivers milk in the city of Lexington as low as 500 and 600 bacteria per c. c. In the large dairy, an extra can, a sometimes slow trolley, a long twelve-foot pipe, and a probably too complicated bottler, and from ten to twenty minutes of time are between the cow's teat and the bottle, making it impossible for this dairy to control counts, although the owner and manager are very anxious to produce milk of the highest sanitary quality. The equipment and method in the smaller dairy are within the reach of every dairyman in Kentucky, and we should all work toward the ideal of ultimately requiring every dairy throughout the length and breadth of the country to come up to the standard there demonstrated to be practical and profitable.

The Kentucky law not only requires the department to inspect

the certified dairies, to determine if their standards are being complied with, but an inspection has also been made, at the suggestion of the Louisville Milk Commission, and your Secretary, Dr. Otto P. Geier. In Louisville, samples were first taken from the market; then the inspectors were dispatched to the various dairies, without their knowing that it would be done, to take samples during the different processes of production. In all instances, the milk as being produced by the dairies and finally delivered to the market was found to be around 5,000 bacteria per c. c., many counts being only a few hundred, and for two months, while the force was located in Louisville, samples were taken, and the results show that the dairies have been living up to the regulations prescribed by the Commission. Lexington has two certified dairies, and we found one of these complying with the standards. In connection with both of these dairies, we found the Commission depending upon tests of milk which had been submitted by the dairies themselves. The bacteriological examinations were being made by one of the country's best bacteriologists, but not of samples obtained from the open market. The recent examination of official samples obtained by the State and city departments from the market have served to call the attention of the Lexington Commission that these certificates, upon which the lives of infants depend, must only be given in exchange for actual, every-day performance in the open market.

The Medical Milk Commissions over the country have already been found to be a strong force in preventing unwise legislation, and in promoting necessary laws and supporting their enforcement. While the certified dairy is the primary purpose of the Commission, yet, by reason of the experience of the certified dairy, the Association of Medical Milk Commissions is an Association which must be drafted into the work of cleaning up all of the dairies. The State and city departments need more force for this important work. The agricultural colleges and State universities throughout the country should be encouraged to make dairy sanitation a stronger feature of their dairy courses, and the work in these colleges should be brought into closer touch and co-operation with the enforcement of the laws. The local

health officers need to be taught the requirements of a clean dairy, and how to advise the dairyman toward the practical and economical details. It is necessary to unite constructive pure milk work with the enforcement of the law, as neither avails much without the other. The Lexington dairyman who saw a light at the last moment, and who is at work cleaning up his place, proves to have been a student in the dairy course at the agricultural college, showing that the teaching of correct principles must be followed by an enforcement of the law. On the other hand, it may be cited that the dairies throughout the United States remained in an unclean condition, although there was plenty of law, until the Dairy Division of the United States Department of Agriculture and the various agricultural colleges began a study of conditions and the teaching of correct principles of dairy sanitation.

The ideal of clean milk is practicable for every dairyman and for every consumer. It may be necessary to do some pasteurization, but if all the forces in the United States working for pure milk will unite in co-operative, intelligent, and persistent effort, it is possible within the present generation to give every city child and other consumer clean, fresh milk, with all of the unanalyzable elements essential to infant feeding which protective pasteurization now partly destroys.

DISCUSSION.

Mr. Ernest Kelly, Washington, D. C.: "I would beg your indulgence just a minute to refer to one point made by Dr. Allen concerning Milk and Cream Shows. I have always considered such Shows to be not so much a criterion of the dairy for the benefit of the public as an educational factor for the benefit of the dairymen themselves. A dairyman may submit a sample of milk that will score 99, although his general milk supply may be no better than that of the man scoring 97; but one thing is certain: in the preparation of their samples they have both learned the elementary principles that underly the production of pure milk, and it has been my experience that

the man who has once learned these methods is much more apt to apply them in the production of his general milk supply than is the man who has not learned them. As an illustration of the principle involved, let us suppose that a prize is offered for the cow that will produce the greatest amount of milk. A man may enter an animal that he has bred and fed so carefully that it will produce an enormous amount of milk. At the same time, that same man may have another cow in his herd that produces only a pint of milk daily. Still, the performance of that low-producing cow should not in the least detract from the performance of the high-producing cow, and I believe that a man who had sense enough to breed such a fine, high-producing animal would not be long in ridding his herd of the low-producing cow. The same principle applies to the production of pure milk. In my opinion, the prime object of these Shows is the education of the farmer in the methods of producing clean milk, and it is the function of the Milk Commission to see that the average production is up to the standard."

CERTIFIED MILK, PAST, PRESENT, AND FUTURE.

Ernest Kelly, In Charge of Market Milk Investigation, Bureau of Animal Industry, Washington, D. C.

It is with some trepidation that I, a layman, venture to discuss before this body the subject which I have chosen. There is no intention on my part to criticise or discuss specific changes in the general scheme governing Certified Milk. Being a layman, my discussion must naturally deal with those points which to a layman appear important.

The Dairy Division of the Department of Agriculture has in the past, and will in the future, insist upon the correct definition of the term "Certified Milk." We do not recognize as certified any milk which is not produced under medical supervision. It is obvious, however, that we cannot attempt to discriminate between efficient and inefficient Commissions. Our object is to aid any one who is striving for clean milk production,

and we stand ready to lend a hand to any Commission that is honestly attempting to reach such a goal.

Any discussion of this subject, to be at all comprehensive, must deal not only with Certified Milk, *per se,* but must also consider the general scheme of production and distribution. I firmly believe that the future success of the Certified Milk movement must be closely related with financial success to the producer.

I realize that this body is here primarily to consider the work of the Commission in connection with Certified Milk, but I wish to briefly discuss the subject from all angles, taking into consideration the viewpoint of the consumer and the producer as well as that of the Milk Commissions.

The Past.

Let us take a brief backward look and see what has been accomplished thus far. As you all probably know, the Department of Agriculture is called upon frequently to conduct milk and cream contests. At these contests hundreds of samples of both certified and market milk and cream have been entered. These samples have been scored on a score card which allows 35 points for freedom from bacteria, 25 points for flavor, 10 points for freedom from visible sediment, 20 points for chemical composition, 5 points for low acidity, and 5 points for the general appearance of the package, such as the protection of the mouth of the bottle, etc. Lately I have tabulated the scores of these contests, and the results, I am sure, will be the source of extreme gratification to this Association. Certified Milk and Cream proved themselves to be far superior to the finest product of the market milk dairies. In these contests, producers were allowed to use any methods they saw fit, so it must be assumed that the samples submitted were the product of their greatest ingenuity.

Regarding the bacterial count, it will be seen that Certified Milk scored nearly seven points higher than did market milk; or, in other words, the Certified Milk had an average bacteria count of between eight and nine thousand, while the market milk had an average count of thirty-five to forty thousand.

Following are the detailed scores compared:

AVERAGE SCORES IN DETAIL.

	PERFECT.	CERTIFIED MILK.	MARKET MILK.	PERFECT.	CERTIFIED. CREAM.	MARKET CREAM.
Bacteria	35.00	30.45	23.87	35.00	29.37	21.32
Flavor and odor	25.00	19.50	20.05	25.00	20.11	19.26
Visible dirt	10.00	8.85	8.36	10.00	9.37	8.77
Fat	10.00	9.64	9.13	20.00	19.53	19.75
Solids not fat	10.00	9.84	9.47	.....	.....	.....
Acidity	5.00	4.73	4.62	5.00	4.74	4.70
Bottle and cap	5.00	4.95	4.53	5.00	4.80	4.62
Total	100.00	87.96	80.03	100.00	87.82	78.42

The Certified Cream scored eight points higher for bacteria than the market cream, and had an average count of nine to ten thousand as against forty-five to fifty thousand in market cream. Certified Milk was superior to market milk in every respect except flavor, where it fell a half point behind. Certified Cream led market cream on every score except fat content, where it fell less than a point behind.

The foregoing figures show conclusively that Certified Milk producers are unequaled as a class when it comes to the production of clean milk from the standpoint of the product alone. Are they as well educated in the economics of milk production? It may safely be said that conditions may be much improved in this direction.

The Present.

At the present time, Certified Milk, considered in itself, is surely and steadily improving, and stands alone as a high-scoring product. This Association should view with much pleasure and pride the results which have thus far been attained in securing a clinically perfect milk.

On the side of the producer, however, success is not so marked. The Dairy Division sent out circular letters to Certified Milk producers, and the answers received indicate that, so far as being a self-supporting business, the movement is not yet on a

satisfactory basis. Eighty-eight answers have been received up to this time; of these, fourteen gave no answer or were not able to tell whether or not the production of Certified Milk was profitable. The remaining seventy-four answers may be grouped as follows:

Not profitable	33
Profitable	22
Not very profitable	4
Fairly profitable	11
Conditional	4
Total	74

The conditional answers include three in which the business was profitable only part of the time and one which stated that profits would be secured if the market were larger. These four answers must be grouped with the unprofitable ones, which gives a final summary thus:

Profitable	37
Unprofitable	37
Total	74

In the profitable class are grouped the fifteen which state that the business is not very profitable, or only fairly so.

From the consumers' standpoint, the use of Certified Milk has undoubtedly been a success, in that it has accomplished much good wherever it has been possible to obtain it. Much more good could be accomplished if its use covered a larger field. Medicines upon the druggist's shelf may contain wonderful healing properties, but if they are not put to actual use they avail little. It can of course be argued that the use of Certified Milk is a good investment, as sickness and death can be prevented, but there are some classes of people to whom a high-priced article is absolutely prohibitive. What, then, can be done to hold down the price which the consumer must pay, and wherein lies the trouble in the present system? This paper is not written with the intention of going fully into the production end of the question, but I feel it to be perfectly proper to enumerate a few of the points which, to an outsider, appear to need much thought.

There is a great range of retail prices reported, and a high price does not seem to be closely connected with financial success or a low bacterial count. Compare these answers: Dairy No. 25 reports that the retail price of milk is twenty cents a quart, the average bacteria count 4,000, and that the business is not profitable, and would require a retail price of twenty-five cents a quart to make it so.

On the other hand, Dairy No. 30 reports that the retail price is twelve cents, bacteria count 3,000, and that the business is profitable. Both dairies retail their own product, and are in adjoining States. The difference is too great to be explained by local conditions. It is apparent that one producer is better trained in the economics of the dairy business than is the other. From the variations in the daily amount of milk per cow, it can further be seen that many unprofitable animals are being kept.

Certified Milk producers, at best, labor under a handicap, as, owing to the high value of the milk, calves are expensive to raise and the replenishing of the herd is apt to be an expensive proposition. Then, too, a higher class of labor is used on most certified farms. It is much to be regretted that many producers when equipping their plants, have fallen into the hands of advisers who were not practical in their ideas. My experience is that clean milk is not a question of white enamel and polished brass, so much as of common sense and eternal vigilance.

It is also very probable that too many small dairies are trying to produce Certified Milk. Averaging the number of cows in the dairies reporting, we find that the successful dairies averaged over ninety-six cows per dairy, while the unsuccessful ones averaged only seventy-three cows, so that the successful dairy was 31% larger than the unsuccessful. Of course it is probable that the larger dairies owe some of their growth to the fact that they are successful business ventures, but I believe that the larger dairy can operate more economically.

The markets for Certified Milk have not been developed as they should. There is a decided apathy among consumers toward the whole question of clean milk. It seems to me that the Commissions can go much farther in the matter than they have done.

The subject should be kept constantly before the public by means of illustrated lectures on milk production, infant feeding, etc. The Association might have made sets of lantern slides illustrating these subjects and could lend them to the Commissions as they need them for lecture work.

There should be a method of distribution which is more equitable. At the present time there is much variation along this line, and in the costs chargeable to the middleman. Of those reporting, twenty-five distributed the product of their dairies while forty-seven did not. From the answers received, it appears to be more economical to distribute through a middleman, especially where the points of production and distribution are widely separated.

Some of the middlemen, however, seem to charge exorbitant prices for distribution. Many city dealers buy market milk from the farmers and are satisfied with from fourteen to nineteen cents per gallon to pay the freight, costs of bottling and distribution, and give them their profit. Certified Milk is almost universally bottled on the farm, and so the dealer has only to distribute it. Nevertheless, we find the following figures:

Producer gets	26	cents	per	gal.
Freight	4	"	"	"
Middleman charges	20	"	"	"
Consumer pays	50	"	"	"

Another dairy received 12 cents out of the retail price of 15 cents, leaving the middleman 12 cents a gallon for distribution. One middleman gets 5 cents a quart for his services, the other 3 cents—a difference of 2 cents a quart for the consumer to pay. In the first instance the milk retails at 12½ cents, in the second at 15 cents, so the first middleman charges 40% of the selling price for his services, while the second gets only 20%.

Two dairies report that they receive 8 cents out of a retail price of 15 cents. It is obvious that many of the middlemen are getting too large a percentage for distribution.

It may be in some cases that too many dairies are supplying one city, so that the output of some of the dairies is curtailed.

The Future.

Certified Milk will undoubtedly continue to improve as sanitary science advances, and will continue to lead all other dairy products in purity.

It is necessary for the greatest good that the prices be kept within reasonable bounds, and this I believe can be done by a closer application of business principles; by the elimination of much ornate, expensive equipment; by a more equitable system of distribution; by the expansion of the markets.

As to standards, that is a work entirely in the hands of your Association and I would not venture upon that ground, except to say that, as I see it, the producers' standpoint should be clearly seen when standards are set.

A much longer study is necessary before more specific predictions can be made, and I realize that I have touched but lightly on the subject.

In conclusion, I wish to congratulate this Association upon its work in the past and to wish it all success in its future efforts to furnish the babies of this country with a safe, moderate priced food. Be assured that the United States Department of Agriculture stands ready to assist at any time any person or persons who are engaged in so laudable a work.

DISCUSSION.

Mr. Neill Roach, Louisville, Kentucky: "I would like to ask Mr. Kelly if, in figuring the cost of distribution and the percentage the middleman receives, he took into consideration whether the producer or the distributor furnished the bottles, whether the distributor every day took the entire output of the producer, or purchased for his changing daily needs, etc. Such things would make a vast difference in the amount the middleman would have to charge. It would also depend somewhat upon whether the middleman was using the Certified Milk to push the ordinary market product, or whether he handled Certified Milk alone."

Dr. T. C. McCleave, Berkeley, California: "The comparative bacterial counts of milk and cream, as outlined by Dr. Kelly, are of great practical importance. It has usually been considered that the greater portion of the bacteria contained in milk goes over with the cream. Mr. Kelly has shown that the average bacterial count of milk was from 800 to 9,000, while that of cream was from 9,000 to 10,000. I think it will be found that, in the average requirements for Certified Milk production, the producer is allowed a maximum count of 10,000 for milk, and anywhere from 25,000 to 50,000 for cream. It would appear, however, that actually there should be very little difference between the bacterial counts of milk and cream, and that a revision of our bacterial standard for Certified Cream is necessary. We are evidently giving the producer a considerable loophole in this respect and stultifying our requirements for cream from a bacteriological standpoint."

Dr. Henry L. Coit, Newark, New Jersey: "This Association has been very fortunate in having the co-operation of the Government service. It is very gratifying that Mr. Kelly came here to-day."

Mr. Ernest Kelly, Washington, D. C. (Closing): "Answering Mr. Roach, I will say that in my paper I made the specific statement that local conditions might vary the figures given a great deal. Whether or not the middleman furnishes the bottles, etc., would, of course, play a very important part. Also, the method of distribution. The man who runs a market milk business can distribute Certified Milk cheaper than one who distributes Certified Milk only, because at best the latter's customers are very scattered and it takes considerable driving and time to deliver the milk."

Dr. George D. Haggard, Minneapolis, Minnesota: "Is it not true that figures showing the cost of producing market milk have been compiled under the auspices of the States?"

Mr. Ernest Kelly: "I think it is, but there has been a great deal of confusion among even the State authorities in figuring

the cost of the production of market milk. Some of them have figured the cost of feeding, subtracted that from the price obtained for the milk, and called the remainder profit, which it is not. It is necessary to figure on the producer's investment, and other items of cost in the production of milk. Perhaps it is a fact that is not generally known to you gentlemen, that it was left to Kentucky to carry off first prize for both Certified Milk and Cream at the National Dairy Show in Chicago last year. The dairy that won those prizes submitted a milk which, to my knowledge, was the highest scoring milk that has ever been submitted to a milk and cream contest anywhere."

Moved by Dr. John W. Kerr that a vote of thanks be extended to the Jefferson County Medical Society and the citizens of Kentucky for the cordial reception tendered the Association. Seconded and carried.

The President then declared the Association adjourned, to meet again in 1913.

Seventh Annual Meeting

OF THE

AMERICAN ASSOCIATION OF MEDICAL MILK COMMISSIONS

1913

COMMERCIAL CLUB
HOTEL RADISSON, MINNEAPOLIS
JUNE 19th and 20th

JOINT SESSION WITH SECTION ON DISEASES OF CHILDREN OF THE AMERICAN MEDICAL ASSOCIATION

UNIVERSITY OF MINNESOTA
PHYSICS BUILDING—OLD CAMPUS
JUNE 20th, 2 P. M.

OFFICERS—1912-3.

OGDEN M. EDWARDS, JR., M. D., President.
5607 Fifth Avenue, Pittsburgh, Pa.

OTTO P. GEIER, M. D., Secretary,
124 Garfield Place, Cincinnati, O.

SAMUEL McC. HAMILL, Treasurer,
1822 Spruce St., Philadelphia, Pa.

COUNCIL.

HENRY L. COIT, M. D., Chairman.

OTTO P. GEIER, M. D.
JOHN W. KERR, M. D.
J. J. THOMAS, M. D.
SAMUEL McC. HAMILL, M. D.
OGDEN M. EDWARDS, JR., M. D.
JOHN R. WILLIAMS, M. D.
THOMAS C. McCLEAVE, M. D.

STANDING COMMITTEES.

Medical Examination of Employees.

HENRY L. COIT, M. D., Chairman.
E. C. FLEISCHNER, M. D.
BEN CARLOS FRAZIER, M. D.
ALFRED HAND, JR., M. D.

Chemical Standards.

L. L. VAN SLYKE, M. D., Chairman.
PROF. THOMAS B. STILLMAN.
PROF. LOUIS A. KLEIN.

Bacteriological Standards.

M. J. ROSENAU, M. D., Chairman.
ROWLAND G. FREEMAN, M. D.
WILLIAM H. PARK, M. D.,
M. P. RAVENEL, M. D.
ROGER D. PERKINS, M. D.

Veterinary Inspection and Protection Against Tuberculosis.

SAMUEL McC. HAMILL, M. D., Chairman; CHESTER H. ROADHOUSE, M. D.
PROF. R. A. PEARSON.

Statistics on Milk Borne Morbidity and Milk Charities.

JOHN W. KERR, M. D., Chairman.
ROWLAND G. FREEMAN, M. D.
HENRY L. COIT, M. D.
RICHARD M. SMITH, M. D.
GEORGE M. TUTTLE, M. D.

Milk Economics.

JOHN R. WILLIAMS, M. D., Chairman.
OTTO P. GEIER, M. D.
CHARLES E. NORTH, M. D.

Working Methods and Standards.

JOHN W. KERR, M. D., Chairman.
SAMUEL McC. HAMILL, M. D
HENRY L. COIT, M. D.

COMMITTEE ON PROGRAM.

OGDEN M. EDWARDS, JR., M. D., CHAIRMAN.
OTTO P. GEIER, M. D.
HENRY L. COIT, M. D.
M. P. RAVENEL, M. D.
S. McC. HAMILL, M. D.

American Association of Medical Milk Commissions.

June 19, 1913, 9:30 A. M.

The President: "Gentlemen, as President of this Association, it gives me a great deal of pleasure to welcome you to the Seventh Annual Meeting——"

Dr. Ludlum: "I would like to rise to a question of personal privilege. I have been on the grounds for the last two days, at the meeting of the American Medical Association, and have heard considerable criticism of the fact that this meeting was in conflict with the meetings of the general society; the attendance that we have here this morning would seem to indicate that there was good ground for the criticism. On the university grounds, and in the buildings over there, I have not seen a single notice of the meeting of this Association. It seems to me that, with the program, and with the attendance we have here, we might perhaps do better if this meeting should be postponed. Furthermore, there is another conflict with the program of the American Medical Association as printed. It puts down our joint meeting with them for to-morrow morning, and our program puts it down for to-morrow afternoon. I would suggest that that session be put in the morning, in accordance with the program as printed by the larger Association, and I would move that our executive session take place to-morrow afternoon, and that we do now adjourn until 8 o'clock this evening."

Motion seconded.

Another Member: "I rise to a point of order; a motion to adjourn outright is not debatable, but a motion to adjourn

under these circumstances is debatable. I think, however, my suggestion will be acceptable to the maker of the motion. I would make my suggestion that, if it were possible for us to get together here at dinner this evening, we might do that. We must have dinner somewhere, and consume from one hour to an hour and a half, and it occurs to me that we might get together here and have our dinner and our talk at the same time. It might be a matter of advantage to us. Dr. Sedgwick says he is sure that they can arrange for dinner here at an expense to us of not more than a dollar or a dollar and a half a plate. This is what we would spend downstairs in the hotel dining-room. I don't know whether this will appeal to the rest of you or not."

Another Member: "Mr. Chairman, if it is agreeable, I would amend my motion to meet at 6:30, and leave the place open, and then I would urge that posters be put up, at least in the lobby of the hotel here and in the Armory Building on the university grounds, so that those who are not present and those who are may know exactly where we are going to be."

The President: "You have heard the motion that we adjourn the meeting, to meet at half past six in this club. In regard to our program conflicting with the others—this program was gotten out at a time when we didn't know exactly when the joint session could be held, and we put it in this way with the idea that it could be changed for the convenience of all. We have talked it over with the others, and it is understood that the joint meeting will be to-morrow morning. I understand that it is possible for us to get dinner here at 6:30. You have heard the motion that we adjourn until 6:30. Those in favor of the motion signify by saying 'Aye,' those contrary 'No'." Carried.

Adjourned until 6:30 P. M.

THURSDAY EVENING, JUNE 19, 1913, 8:30 P. M.
At Commercial Club.

Meeting called to order by the President.

The President: "This is an adjourned meeting, adjourned from this morning. You have all heard the address of welcome of your President (laughter); we will now hear the report of the Secretary.

The Secretary: "My report will be somewhat brief, I hope, omitting all the preambles."

REPORT OF THE SECRETARY,

For the Year 1912-1913.

The Secretary has to report very little progress during the year. For financial reasons, the proceedings of the Louisville meeting could not be published. The Treasury Department of the United States Public Health Service has published the "Methods and Standards for the Production and Distribution of Certified Milk," and a copy has been sent to each member of the Association and others interested in clean milk production.

To my knowledge, but one new Commission has been organized during the year—the Buncombe County Medical Milk Commission at Asheville, North Carolina. The Asheville Commission has been most active in presenting a Certified Milk bill in the North Carolina Legislature.

Other cities interested in the organization of Medical Milk Commissions are Atlanta, Georgia; Hillsboro, Texas; Montgomery, Alabama; Charlestown, West Virginia; Rockford, Illinois, and Dunkirk, New York.

There are now sixty-three Commissions known at the office of the Secretary, representing twenty-five States and Canada, viz: Alabama, California, Colorado, Connecticut, Florida, Illinois, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Washington, West Virginia, Wisconsin, and Canada.

The Secretary deplores his inability to meet the demands made upon him to personally visit cities desiring to organize Medical Milk Commissions. Each year only fortifies us in the belief that one of the greatest needs is a field secretary to carry on the propaganda work of the Association. A greater knowledge by this Association of the efficiency of the various Commissions, and the quality of the products under their supervision, is urgently required. As one step in this direction, your Secretary urges that this Association appeal to the Secretary of the Department of Agriculture for the service and time of the proper officials who shall make a critical survey of the certified dairies under the supervision of Medical Milk Commissions.

(Signed) OTTO P. GEIER, *Secretary.*

The President: "Are there any corrections of the Secretary's report?"

The President: "You have heard the report of the Secretary; what is your pleasure?"

Moved that the report of the Secretary be accepted.

Seconded and carried.

The President: "The next order of business is the report of the Treasurer, which is comprehended in the report of the Council. We will hear from the Secretary. The Secretary will read the report of the Council:

MEETING OF THE COUNCIL.

Hotel Radisson, Minneapolis, Minnesota, June 19, 1913.

Present—Drs. Edwards, Williams, Kerr, McCleave, and Geier.

Council recommends that the next meeting of the Association be held in Rochester, New York, previous to the meeting of the American Medical Association at Atlantic City.

Recommends for membership in the Association, the Buncombe County Medical Milk Commission, of Asheville, North Carolina.

Council, in accordance with instructions of the Constitution,

places in nomination the following names as officers of the Association for the year 1913-1914: For President, Dr. John W. Kerr, of Washington, D. C.; for Secretary, Dr. Otto P. Geier, of Cincinnati, Ohio; for Assistant Secretary, Dr. William J. Graf, of Cincinnati, Ohio; for Treasurer, Dr. J. P. Sedgwick, of Minneapolis, Minnesota; for Council for term of five years, Dr. Walter D. Ludlum, of Brooklyn, New York; for member of Council to complete Dr. Kerr's term of office, Dr. Richard M. Smith, of Boston, Massachusetts.

Council further recommends that the Secretary of Agriculture be requested to make a survey of all dairies and products under the supervision of Medical Milk Commissions for the purpose of determining the efficiency of the supervision and the results thereof, this survey to be used as a basis of a report to the meeting of the Association next year.

The Secretary then read the Treasurer's report:

REPORT OF THE TREASURER.

June, 1913.

Balance from last year's account	$150 20
Received in dues from 34 Commissions for the year 1912-1913	510 00
Received in dues from 1 Commission for the year 1911-1912	15 00
Received in dues from 23 individual members for the year 1912-1913	69 00
Received in back dues from individual members	15 00
Received from sale of Proceedings	60 00
Total	$819 20
Amount of expenses	651 14
Balance	$168 06

The President: "You have heard the report of the Treasurer; what have you to say in regard to it?"

Moved and seconded that the report of the Treasurer be accepted. Carried.

The President: "The report of the Council is the next business in order."

The Secretary here read the report of the meeting of the Council, June 6, 1913:

MEETING OF THE COUNCIL.

Harrisburg, Pennsylvania (Senate Hotel), June 6, 1913.

Present—Drs. Coit, Williams, Edwards, Kerr and Geier. Dr. Coit presiding.

The action of the Council at the previous meeting was approved.

The application of the Buncombe County Medical Society Milk Commission (Asheville, North Carolina) was presented by the Secretary. On Dr. Kerr's motion, Council recommended to the Association that the Buncombe County Medical Milk Commission be admitted to membership on the basis that they sign the agreement that they will be governed by the standards adopted by this association.

Dr. Kerr moved that the provision presented by Dr. McCleave at the Louisville meeting in regard to the standards and requirements adopted by the Association for the production of Certified Milk, be offered as a by-law to the Association, amending Section 1, Article 3: "That this Association adopt the report of the the committee as the working methods and standards of the Association, and recommend them to component Commissions to be followed as closely as possible."

A letter of resignation from Dr. Hamill as Treasurer was presented. The resignation was accepted with regret, and the Secretary instructed to send a letter of appreciation to Dr. Hamill for his great service to the Association in the past years as Treasurer. Dr. Hamill's report as Treasurer was received, read and approved. On motion of Dr. Kerr, the Secretary was instructed to write to each Commission and the individual members who have been derelict in the payment of their dues, that their membership in the Association will lapse and their names be dropped from the roster of the Association if a favorable answer or intention to meet these dues is not received.

On motion, Dr. Kerr was made a committee of one to recommend a list of honorary memberships for the Association, this

list to be approved by Council preliminary to the meeting of the Association.

Council authorized the expenditure of a sum, not to exceed $50 for an exhibit representing the work of the Milk Commissions, to be prepared by Dr. John R. Williams of Rochester, New York.

The President of the Association, on motion, was instructed to appoint delegates to the Congress on School Hygiene in Buffalo, August 25-31.

Action was deferred on the invitation from San Francisco for the 1915 meeting.

The resignation of Dr. T. Y. Sutphen, of Newark, New Jersey, was received and accepted.

The President was requested to invite guests to the meeting at Minneapolis, Minnesota.

The Council then admitted to the meeting Dr. B. Thomas Whitmore of Lakewood, New Jersey, who presented a plan for the publication of a monthly journal devoted to clean milk. It was Dr. Whitmore's idea that in no better way could the cause of the Medical Milk Commission be furthered; that the extension work of the Association would be definitely helped, and that ultimately quite an income be derived from such a publication. This journal to be directed not only to the profession, but to the laity as well. The plan was presented in written form. The matter was fully discussed, but no action taken. Copies of the recommendations of Dr. Whitmore were ordered sent to the members of Council for future deliberation.

(Signed) OTTO P. GEIER, *Secretary.*

The President: "You have heard the reading of the report of the Council. What is your pleasure with regard to it?"

Moved and seconded that it be accepted and placed on file. Carried.

The President: "If it is your pleasure, we will vote on those positions at this time, or later on, as you see fit."

Dr. Ludlum: "My motion this morning and the Constitution and By-laws both prevent that. The Constitution and

By-laws expressly provide that that shall be held in the afternoon session, and my motion made the same provision."

The President: "If there is no motion to take up this matter at this time, we will proceed with the other business."

A Member: "Does that mean that the election takes place to-morrow afternoon?"

The President: "To make it clear to everybody here, the election of the officers is performed by the so-called House of Delegates. The scientific program is open to every one. The House of Delegates is supposed to be a committee of the whole, and the custom has been that at the completion of the scientific session the House goes into the so-called House of Delegates, and at that meeting only those entitled to vote attend, except those who might be there by invitation. That is the ordinary thing, and I think there is no difference of opinion on that at all. Dr. Van Derslice's statement is correct, that the election takes place at the end of the second session. It would be difficult to vote under those circumstances; but in a meeting where only those who have registered and are accredited as delegates and as members of this Association are present, this action takes place."

The President: "The next order of business is the report of the standing committees. We would like to hear from Dr. Coit's Committee on the Medical Examination of Employees."

Dr. Henry L. Coit: "Mr. President, it has been impossible to get in correspondence with the members of this committee, with a member in Cleveland, a member in Philadelphia, and a member in Louisville. Last year the Committee on Methods and Standards did a lot of preliminary work looking towards this feature of a Commission's work.. A questionnaire was prepared by the Committee on Methods, Requirements, and Regulations. This questionnaire included several questions relating to the medical examination of employees. Dr. Kerr, who is chairman of this committee, tabulated all

these replies to the sixty-nine questions, which were compiled by Dr. Hamill and myself, and sent out to seventy-two Commissions. Complete replies were obtained from forty-four Commission. The replies concerning medical inspection of employees showed that more than fifty per cent of the Commissions were making medical inspection of employees regularly and had a medical officer appointed who reported to the Commission upon the health and hygiene of the employees.

"The Essex County (New Jersey) Commission undertook to determine whether among the dairy employees on its plant any were possible typhoid fever bacillus carriers; our method was to take the eighty-five men in groups of eight; a sample of blood was collected by the medical officer and examined. Out of the eighty-five men there were three who showed a positive widal. These men were isolated from the gang, and one of them was permanently removed. The other two were permitted to work in the field, but not in the bottling of milk nor to work in the barns or in the dairy buildings. We have not completed the investigation yet. The examination of the excreta of a man who may be a typhoid fever bacillus carrier is now feasible; the Government has issued a bulletin making it a simple procedure. We believe we were the first Commission to undertake this feature of the health and hygiene of dairy employees, and I report it because of its interest."

Dr. Ludlum: "One point in regard to protection against typhoid is that every employee should receive a proper inoculation of anti-typhoid vaccine. With those who have not had typhoid we found it is almost absolutely effective; the expense is small, and the benefits are large. I think it is accepted at the present time that typhoid, aside from the water borne, is more often due to milk conditions than to any other source. I think that in the recommendations of this Committee on Medical Examination and Care of Employees, a recommendation might very properly be made that every dairy employee receive the anti-typhoid inoculation."

The President: "You have heard Dr. Coits' report. Is there any more discussion?"

Dr. Coit: "May I accept that suggestion of Dr. Ludlum's and include it as a part of the recommendation of the committee?"

A Member: "I move that the report and recommendation be accepted."

Seconded and carried.

The President: "Dr. J. R. Williams is to report the work of the Committee on Milk Economics."

REPORT OF THE COMMITTEE ON MILK ECONOMICS.

John R. Williams, M.D., Chairman.

The Committee on Milk Economics herewith submits the report of its work during the past year. The first and most important step in the solution of the milk problem is securing pure milk. The next step, and of almost equal importance, is to secure it at reasonable cost. So important is pure milk to the welfare of the community that it should be had for those who need it, no matter what may be the financial cost. In proportion, however, as pure milk is beyond the use of the community, in that proportion will its use be limited. Accordingly, for the fullest development of this movement it is highly essential that pure milk be made available to every home. This means procuring pure milk at a reasonable cost, which is the second step in the milk problem.

The high cost of pure milk to the consumer, beyond question, is the great barrier now preventing the general use of pure milk. If it were possible to sell to the consumer Certified Milk at the price of market milk, there would be little difficulty in converting every consumer to the desirability of using Certified Milk. Unfortunately, this is impossible because the prevailing conception of the money-value of milk is based on that which is produced without regard to cleanliness or safety. These

factors of cleanliness and safety to a milk supply mean intelligent manual labor; the abundant use of water, coal, and ice, and the occasional sacrifice of animals reacting to tuberculosis tests.

At the present time more than ninety-eight per cent of milk consumers in the United States prefer to purchase milk at a lower price than to renumerate the dairyman for the above-named safeguards. A proper definition of reasonable cost must provide for the adequate renumeration of those who supply these elements necessary to the purity and safety of the milk.

In view of the high prices of Certified Milk which prevail throughout the United States, and because of the ever increasing cost of living, it would seem desirable to make a general economic examination of the whole milk problem with a view of determining whether or not pure milk can be produced and marketed at a price within the means of the average home. In a paper before this society at its last annual meeting a member of this committee detailed the results of an economic investigation of the milk supply of Rochester. The general conclusions from this investigation lead to the belief that it is not possible to produce pure, clean milk at the price now received for it by the farmer, but that there is a tremendous waste in the distribution of milk, which, if avoided, would not only afford greater renumeration to the farmer, but would materially lower the cost to the consumer.

In this study it was shown that the business of distributing milk is in the hands of a large number of small dealers, with crude and illy-suited equipment, whose routes overlap to an absurd degree, so that there is not only a very large investment in the duplication and reduplication of bad equipment, but there is also a tremendous waste of labor and time in the overlapping of routes. It was pointed out that milk distribution under this wasteful system costs at least three times as much as it should.

In view of the importance of these statements, your committee has endeavored to learn how general is this waste in distribution throughout the United States. Accordingly, it addressed a schedule of questions to the health officers of fifty

representative cities with the request that they be given the most thoughtful consideration. In most instances, these questions were answered in detail and with a degree of care which inspires confidence in their accuracy. The committee wishes to acknowledge its appreciation of the courtesy of these health officers.

TABLE SHOWING AMOUNT OF MILK USED, NUMBER OF DEALERS AND MILK WAGONS EMPLOYED IN DISTRIBUTION IN VARIOUS AMERICAN CITIES.

City.	Population.	Milk Used Daily Quarts.	Total Number Dealers.	Total Number Wagons.	Average Number Qts. per Wagon.	Average Number Fam's per Wagon.
Chicago	2,000,000	1,024,000	1,300	3,000	270	135
Philadelphia	1,632,000	500,000	450	1,500*	265	215
Boston	735,000	271,000	257	641	230	230
Cleveland	600,000	100,000	441	641	125	185
Baltimore	570,000	121,000	204	487	195	235
Buffalo	445,000	140,000	260	450	250	200
Rochester	225,000	90,000	220	360	200	125
Syracuse	150,000	42,000	78	194	170	155
Youngstown	100,000	48,000	170	185	210	108
Erie	71,000	25,000	59	90	225	160
Harrisburgh	67,000	20,400	195	195*	85	69

Note.—The data for this table was supplied by the departments of health of the various cities. At least twenty per cent of the total milk supply of each city is used in wholesale trade or for manufacturing purposes. This allowance is made in computing domestic distribution.

*Estimated. Data not attainable. Only a portion of the data collected by the committee is given in this table. The above cities are typical examples of conditions which prevail throughout the United States.

A word of explanation of the data may be of interest. In Chicago apparently about one quart of milk per inhabitant is used; in Louisville, 8/100 of a quart, which is far less milk than is used by any other city in the United States of which we have information; Philadelphia uses 3/10 of a quart per inhabitant; Boston, 4/10 of a quart; Cleveland, 2/10 of a quart; New Orleans, about the same; Richmond, Virginia, 2/10 quarts; Rochester, New York, 4/10 quarts. The cities of Richmond, Memphis, and Omaha are all about the same size, with approximately 130,000 population. Richmond uses about 28,000 quarts per day; Memphis, 32,000 quarts; Omaha, 40,000 quarts.

It requires 78 wagons to distribute the milk in Richmond, 228 wagons to distribute almost the same amount in Memphis, and 120 in Omaha. This variation in the number of milk wagons and distributors obtains in many other cities of the same size in the United States. Another example of the variation is as follows: Louisville has a population of 230,000 and it uses 18,000 quarts of milk; Portland, Oregon, where there is 256,000 population, uses 64,000 quarts of milk. There are three hundred and twenty milk wagons engaged in the milk distribution in Portland, which indicates a tremendous waste.

Your committee was formed as a result of the feeling that the economic phase of the milk problem is of sufficient importance to demand the attention of public health workers. It regrets that it has not been able to make investigations or to study as should be done many of the problems which are concerned with the production and distribution of Certified Milk. It would be proper and valuable for such a committee to undertake and advise with Commissions as to the best methods of production and distribution costs, etc., although this particular sphere of activity comes within the province of the Certified Milk Producers' Association. Nevertheless, the Certified Milk producers in many towns and cities are small farmers and are not allied with the producers organization. They are the beginners in the work and they are constantly seeking aid as to methods of business management, as are their controlling Commissions. If it were possible for your committee to obtain and classify the information which individual producers and distributors now have, for the benefit of our Association and the dependent producers, we feel that it would materially assist in the solution of the Certified Milk problems of many cities. Such work cannot be successfully carried on without skillful clerical assistance, and should be done for the committee through a central clearing house or paid secretary's office.

The President: "The Society has heard the carefully prepared report of Dr. Williams. What is your pleasure in regard to that?"

Moved and seconded that it be placed on file. Carried.

The President: "Dr. Kerr unfortunately is unable to be here with us, and he asked Dr. Coit to read the report of the Standing Committee on Statistics on Milk Borne Morbidity and Milk Charities."

Dr. Coit: "I have the honor of presenting Dr. Kerr's report, since he was called back to Washington this afternoon:"

June 3, 1913.

DR. GEORGE M. TUTTLE,
St. Louis, Mo.

Dear Doctor,—At the last meeting of the American Association of Medical Milk Commissions, the following Committee on Statistics of Milk Borne Morbidity was appointed: Dr. Rowland G. Freeman, Dr. H. L. Coit, Dr. Richard M. Smith, Dr. George M. Tuttle, Dr. J. W. Kerr, Chairman.

No extensive report of this committee seems possible at the next meeting to be held in Minneapolis. It seemed worth while, however, to invite attention to outbreaks of septic sore throat, and to briefly summarize these outbreaks. This has been done in the accompanying draft of a report. If you think this report to be suitable, I should like to submit it on behalf of the committee.

Very truly yours,
(Signed) JOHN W. KERR.

SEPTIC SORE THROAT:

A Disease to be Guarded Against in the Production of Certified Milk.

In previous annual meetings of the American Association of Medical Milk Commissions, data have been presented showing the extent of the production of Certified Milk and its use, particularly in milk dispensaries to reduce infant morbidity. No detailed studies for 1912 have been made by any member of the committee to bring this data up to date. Important studies have been conducted, however, by the New York Milk Committee in relation to the problem of reducing infant mortality,

and the results published in a report in which the work carried on in the ten largest cities of the country is presented.[1]

This report indicates that there was a signal reduction in infant morbidity as a result of campaigns for cleaner milk and better care of infants. Not all of the milk was certified, but the object in all cases was to have clean milk. In this, therefore, there is encouragement that the pure milk movement is growing and bringing results.

At this time your committee believes it is not only opportune but necessary to invite attention to a potential danger to the pure milk movement as evidenced by outbreaks of septic sore throat transmitted by infected milk supplies.

Winslow, in 1911, reported what is believed to be the first record of an epidemic of this disease in the United States traced to milk.[2] The outbreak appeared in Boston and its suburbs, and record was obtained of 1,043 cases. The following is a record of the outbreaks, including the one in Boston and vicinity, regarding which your committee has obtained information:

OUTBREAKS OF SEPTIC SORE THROAT.

PLACE.	DATE.	CASES.	DEATHS.	REPORTED BY
Hudson, Marlboro, and Southboro, Mass.	April and May, 1911.	392	.....	Winslow, Published.
Boston, Brookline, and Cambridge, Mass.	May, 1911.	1,043	48	Winslow, Published.
Batavia, Ill.	Dec., 1911.	139	.....	Capps & Miller, Published.
Chicago, Ill.	Dec., 1911, to Feb., 1912.	10,000 Estimated.	19 Invest'd.	Capps & Miller.
Ocean View and Norfolk, Va.	Fall of 1911.	Number not stated.	None stated.	Schenck, Letter.
Baltimore, Md.	Dec., 1911, to Apr., 1912.	Over 602.	28	Frost, Published.

[1] Infant Mortality and Milk Stations, New York Milk Committee, 1912.
[2] Winslow, Journal of Infectious Diseases, January, 1912, p. 73.

OUTBREAKS OF SEPTIC SORE THROAT.—Concluded.

PLACE.	DATE.	CASES.	DEATHS.	REPORTED BY
Concord, N. H.	Jan. and Feb., 1912.	1,000 Estimated.	4 Recorded.	A. T. Mann, Published.
Brooklyn, N. Y.	Early in 1912.	Number not stated.	.....	North, Letter.
Canton, Mass.	1913.	About 300.	20	Richardson, Letter.
Norton, Mass.	1913.	About 54.	None.	Richardson, Letter.
Cortland and Homer, N. Y.	Part of April and May, 1913.	669	None stated.	North, Letter.

In addition to the above, an outbreak of septic sore throat in Ann Arbor in March, 1912, was reported by Smith,[8] although the infection was not traced to milk.

Here, then, are twelve distinct outbreaks of septic sore throat, eleven of them having been traced to infected milk and comprising at least 24,000 cases, with 119 reported deaths. These figures represent the minimum number of cases and deaths, since in two of the outbreaks mentioned the number of cases is not stated in the tables, and in other outbreaks recorded, many cases undoubtedly escaped detection and were thus not included in the totals.

In the Boston epidemics, the milk supply involved was unpasteurized, but was obtained from dairies under strict sanitary control. In the Chicago and Baltimore epidemics the milk supplies were subjected to the "flash method of pasteurization," which, however, was evidently inefficient. None of the dairies were those producing Certified Milk.

In some of the epidemics there was a history of mastitis among the herds, and in others, histories at the same time of illness among the dairy employees.

Outbreaks of septic sore throat traced to milk have been

[8] Transactions of the Clinical Society of the University of Michigan, University Bulletin, New Series, Vol. XIV, No. IX.

reported in Great Britian from time to time ever since 1875. Smith states that Hall, of Denver, described an epidemic of this disease in this country thirty years ago[4], and Novy referred to a report in 1888, by Prudden, on twenty-four cases of streptococcus sore throat which occured in a New York institution. In view of all the above facts, it would appear highly probable that milk borne outbreaks of septic sore throat have occurred in the United States from time to time for years.

It is difficult to see how such outbreaks can be prevented by any reasonable amount of dairy supervision, and the greatest care will be necessary to detect and cut them short should they arise in connection with the production and handling of Certified Milk. Veterinary inspections, immediate reports of throat infections among employees of farms, and the frequent and most careful examinations of these employees is becoming more and more indicated. In fact, a new mass of evidence has been presented, which emphasizes that minimum bacterial content alone is not a true index of safety of milk supplies, and that the much more time consuming and expensive method of medical and veterinary supervision must be relied upon in greater degree if safe raw milk is to be produced. Wherever this is impracticable, pasteurization is the only alternative, and the holding process must be invariably employed under rigid official supervision.

J. W. KERR, *Chairman.*
HENRY L. COIT.

New York, June 10, 1913.

MY DEAR DR. KERR:

I have received your report on "Septic Sore Throat," which seems to me a very valuable contribution.

I feel, however, that no medical or veterinary supervision can render milk safe, nor do I believe that commercial pasteurization by the holding process renders milk safe if it is true that the milk contains some 50,000 bacteria when delivered after having been subjected to this process. The only real

[4] Transactions of the Clinical Society of the University of Michigan, University Bulletin, New Series, Vol. XIV, No. IX.

security is home pasteurization. When efficient commercial pasteurization can be accomplished without subsequent contamination of the milk, that will of course be sufficient.

Very sincerely,

ROWLAND G. FREEMAN.

Saint Louis Missouri, June 5, 1913.

DR. J. W. KERR,
Washington, D. C.:

Dear Doctor,—I highly approve of this report you have prepared for the Minneapolis meeting. Thanking you for submitting the manuscript to me, Yours truly,

GEORGE M. TUTTLE.

Boston, Mass., June 7, 1913.

DR. J. W. KERR:
Treasury Department, Washington, D. C.

Dear Dr. Kerr,—Your letter of June third, with the copy of the report of the Committee on Statistics of the Milk Morbidity for the American Association of Medical Milk Commissions, has been received. I think this report is very satisfactory and will be glad to have it submittted for the committee.

Yours sincerely,

RICHARD M. SMITH.

The President: "You have heard this very valuable report, and this report will end the reports of the standing committees. The chairmen of the other committees unfortunately are not with us this afternoon . The next in order will be the miscellaneous business. If there is any new business which any one wishes to bring before the Society at this time, they may do so."

Dr. Ludlum: "I move that we proceed with the scientific program."

The President: "Is there no miscellaneous business?"

Mr. Miller: "I do not wish to intrude, but I have a petition which I wish to present."

The President: "We will hear Mr. Miller's communication."

Mr. Miller: "I wish to say, Mr. Chairman and members of the Association, that I am here as a representative of the Certified Milk Producers' Association of America. At the meeting at Great Barrington, Massachusetts, last week, three of us were designated to attend this meeting: Mr. Stephen Francisco, Mr. Harry B. Winters, and myself. We adopted the following motion at the close of our convention: that the Certified Milk Producers' Association of America accept and adopt the recommendations of the American Association of Medical Milk Commissions. Following the passage of this motion, the following resolutions were passed:"

Resolved: That the American Association of Medical Milk Commissions be requested to present standard requirements for milk marked certified that shall be clearly stated so far as the essentials are concerned, and that these essentials shall in all cases be enforced; that the nonessentials shall be estimated as suggestions only; and that the essentials that may be designated by the American Association of Medical Milk Commissions shall be presented to the Certified Milk Producers' Association and the final draft adopted by both Associations.

Resolved: That the American Association of Medical Milk Commissions be, and hereby is, respectfully requested to carefully consider at its next meeting the great importance of allowing all milk certified by a Commission to be sold as Certified Milk in all districts without duplication of the work of the first Commission.

Resolved: That the appointment of a Council Board be further considered—to consist of one person appointed by the American Association of Medical Milk Commissions, one by the Certified Milk Producers' Association, and one by the Department of Agriculture of the United States Government.

Resolved: That the secretary-treasurer be directed to present a copy of these resolutions to the President of the American Association of Medical Milk Commissions before the date of their next meeting.

"I think I ought to say by way of supplement to this, that we feel that the requirements and rules adopted last year by your Association at Louisville need some clarifying in order to be stated more definitely. There are certain things which we all recognize as mandatory in the production of Certified Milk. We think that the interests of the producers will be furthered if you will kindly designate the things which are mandatory, and also by inference the things that are recommendatory, to meet certain important papers. The gentlemen whose names I have mentioned constitute what we choose to call a Committee of Co-operation. Our Association not only extends greetings to yourselves, but invites you to closer co-operation, in order that better results can be accomplished —even better results than in the past—by a closer form of co-operation. There are some things that we would like to suggest this year in the way of co-operation, if we may have the opportunity. One of them looks to the education of the medical fraternity in regard to the nature of Certified Milk, its object and uses. We think we have a plan that is practicable, which will result in a wider dissemination of correct ideas among the medical men of what Certified Milk is. I thank you."

Dr. Ludlum: "I move that Mr. Miller's communication be received and acted on by the House of Delegates to-morrow afternoon."

Dr. Van Derslice: "I would like to ask what the proportion of the membership of that Association is in regard to the total number of Certified Milk Producers."

Mr. Miller: "There are a few over forty in the Association. I think there are about one hundred producers of Certified Milk—one hundred dairies in the United States."

Dr. Myers: "A motion was made that this report be referred to the Council for action, and by them presented to the business session. It seems to me that it might facilitate the handling of matters if it could be passed upon by the Council, and presented for action at the next meeting of the House of Delegates."

Dr. Van Derslice: "It seems to me that there can be only a few things in which this Association is competent to take part, about which there would be any discussion; and if they could be brought out now, I do not believe it would take over five or ten minutes to handle the whole thing; and Mr. Miller, being the chairman of his committee, if there is no special objection,—we have passed the scientific program on this far, we might as well pass it a little further. What motion is before the house, or what motion may be spoken to?"

The President: "The motion to refer this report to the House of Delegates. You accepted the amendment."

Dr. Ludlum: "I do not agree with all the recommendations made by Mr. Miller. With some of them I might, but there are things in those recommendations which meet with my absolute disapproval."

Dr. McCleave: "The Council as a body must pass on his communication, which came to the Secretary some time since, and at whatever time the matter is put up to this body for discussion, the recommendations of the Council can be made then."

Dr. Ludlum: "I appreciate that it is within the province of the Council to act on these recommendations, or present such recommendations to us as they see fit."

The President: "This question is one which evidently calls for the action of the Council, and this report should be referred to them. Those in favor of referring this matter to the Council say 'Aye.'" Motion carried.

The President: "If there is no further business, we will proceed to the scientific program for the evening. The first paper is by Dr. Grulee, of Chicago, on the 'Formation of Acids in the Fermentation of Milk, and Their Importance in the Causation of Nutritional Disturbances in Infants.'"

THE FORMATION OF ACIDS IN THE FERMENTATION OF MILK AND THEIR IMPORTANCE IN THE CAUSATION OF NUTRITIONAL DISTURBANCES IN INFANTS.

Clifford G. Grulee, M.D.

For many years milk which has stood for twenty-four to forty-eight hours under ordinary conditions and had undergone change from the action of bacteria has been regarded as unfit food for infants. Perhaps none of us will question that milk so changed is unfit for infants, and it remains for us to determine why such is the case.

It is a fact which has been long known that unboiled milk, undergoing decomposition from ordinary bacteria, does not putrify, but ferments; and this is true for a long period—so much so that Blumenthal and Wolff[1] were able to find only a relatively small amount of amino acids in milk which had stood several months and years. This being the case, it is natural for us to look to the production of ferments for those agents which cause nutritional disturbances in infants fed on milk which has been subjected to bacterial action for twenty-four to forty-eight hours.

In the fermentation of milk the principle acid formed is lactic acid. As is now well known lactic acid in the amount which is produced in the fermentation of milk, and indeed in far larger quantities, is not disturbing to the digestion or metabolism of the infant. This is very well shown by the excellent results which are frequently obtained by the use of artificially prepared buttermilk, both in healthy and nutritionally disturbed infants. Together with the formation of lactic acid, however, many of the lower volatile fatty acids are formed in small quantities, and

[1] Charte Ann., XXIX., 12.

analysis of their action may be of some value. The fatty acids thus formed are acetic, butyric, capronic, capryllic, etc. The work done by Langstein, Bahrdt, Welde, Edelstein, von Csonka, Huldschinski, and Bamberg[1] in the Kaiserin Auguste Victoria Haus, in Berlin, is worthy of our most earnest consideration. While the problem which they took up was somewhat different than that under discussion, many of their findings can be directly applied to the proposition here considered. In the first place, Edelstein and von Csonka invented a method for qualitative and quantitative estimations of the lower fatty acids, and this enabled them to make estimations which were of much value. They found that in sour milk the chief volatile fatty acid was acetic acid, and that this was present to the amount of .05%. This milk was of two days' standing. In buttermilk, acetic acid was present in .03%, and was combined with a small amount of butyric acid.

Bahrdt and Bamberger, following up this work, found that acetic acid was the most active of all the acids formed in producing increased peristalsis, and with it diarrhoea and vomiting; but the quantity of acetic acid—.2 to .25 gr. per kilo weight—which was used in producing these symptoms on dogs, was far in excess of any amount of acetic acid produced by the decomposition of milk. Bahrdt and Bamberger therefore conclude that acid so produced could hardly be regarded as active cause of acute dyspepsia. It seemed to them, however, in a further research that the pylorus in these dogs acted more or less as a safety valve, so that when large quantities of those volatile acids were present in the stomach the pylorus tended to remain closed and allowed only small quantities to go through at a time. This, however, was not definitely proven.

Huldschinski then took up the problem in respect to children, and found in the stomach of normal infants that as much volatile fatty acids were present if the infants were fed on cow's milk as if fed on human milk; the quantity of the fatty acids depend upon the amount of fat in the nourishment. These, experiments, too, he continued on fifty children suffering from various

[1] Zeitschr. f. Kinderhlk., Vol. I., p. 139.
Vol. III., pp. 313, 322, 350, 366 (1911).
Vol. V., p. 475 (1913).

nutritional disturbances. He found that in these the amount of fatty acids in the stomach is not in excess of that found in normal infants, and thinks that "abnormal fermentation processes in the stomach of infants as a result of stagnation must be regarded as questionable." He concludes that such acids cannot produce a disturbance of the gastric functions, but that in order that these acids may become active, a disturbance of the functions must already exist. If we take a look at these results, we will see that the amount of acid formed is not sufficient in itself to produce acute dyspepsia.

Tissier and Gasching[3] found a quantity of acid in milk which had fermented two to four days corresponding to 1.47 to 2 grams of sulphuric acid per liter. This consisted largely of lactic acid, but a small amount of acetic and butyric acid was present. In very few infants would we be likely to use more than a quart of milk in twenty-four hours. Should this infant weigh as low as fifteen pounds, or seven kilos, that would correspond to .2 to .3 gram of total acid per kilo. We see, then, that the total acidity thus produced would be just about the same as the amount of acetic acid which was necessary to produce acute dyspepsia in a dog. We must, therefore, conclude that in the present state of our knowledge it is altogether unlikely that the acid formed in the fermentation of milk is a direct cause of dyspepsia in infants, provided the gastric functions of these infants is not seriously deranged. We must, therefore, look elsewhere for the cause of the nutritional disturbances which so frequently follow the administration of stale milk to infants.

The President: "Is there any discussion on this very interesting paper of Dr. Grulee's?"

There was no discussion.

The President: "The next is a paper by Drs. Larson and Sedgwick, of Minneapolis, on 'Complement Deviation Reaction in the Blood of Children, Using the Bacillus Abortus as the Antigen.'"

[3] Ann. Inst. Past., 1903, XVII., p. 540.

THE COMPLEMENT FIXATION REACTION OF THE BLOOD OF CHILDREN AND INFANTS, USING THE BACILLUS ABORTUS AS ANTIGEN.

W. P. Larson, M.D., and J. P. Sedgwick, M.D., Minneapolis.

The passage of substances through the intestinal wall, and the effect of the ingestion of biologically active bodies on the reactions in the blood and other tissues, has been a subject of much interest to many, and especially so to pediatrists. We hope to throw some light on this problem by the demonstration of the fact that a specific reaction can be obtained in the blood of a considerable number of children.

The specific reaction in question is that of the complement fixation test, using the bacillus of infectious abortion of cattle as an antigen. The significance of this particular reaction becomes apparent when we consider that epidemic abortion is common among cattle; that the presence of the *Bacillus abortus* can be demonstrated in cow's milk, and that the reaction is seemingly specific.

The discussion concerning the enteral absorption of homologous or heterologous proteins has been, and still is, of great interest, but if we turn at once to the subject of the effect of the ingestion of biologically active substances, such as toxins and antitoxins joined with proteins, several illuminating studies are at our disposal.

Römer[1] was able to show in 1901 that a colt, the blood of which at birth was found to be antitoxin-free, and which was fed with its mother's milk, which contained diphtheria antitoxin, then gave proof of having antitoxin in its own blood. After the twelfth day, however, no further antitoxin absorption could be demonstrated, and the antitoxin content of the colt's serum then rapidly decreased.

This is of especial interest in connection with the position taken by von Behring concerning other proteins and the tuberculosis question, suggesting the greater possibility of absorption of such products by the new-born.

[1] Römer: Untersuchungen über die intrauterine und extrauterine Antitoxinübertragung von der Mutter auf ihre Deszendenten, Berl. klin. Wchnschr., 1901, xxxviii, 1150.

Salge[2] gave antitoxic horse serum by mouth to human infants. In no instance was he able to demonstrate the passage of the antitoxin into the infant's blood, even in the new-born. When, however, the antitoxic horse serum was injected subcutaneously into the mother or nurse, and the child put to the breast, the passage of the antitoxin to the child's blood could be shown.

Uffenheimer experimented with the administration of serum-hemolysin, casein, egg-albumin, diphtheria and tetanus antitoxins, by mouth, to new-born guinea-pigs. The hemolysin and casein did not pass over. The egg-albumin could be demonstrated in traces only. The antitoxins could, however, be demonstrated in the blood of the new-born pigs.

The recent work of Hehn, taken with that of Lust,[3] indicates that antitoxins in heterologous serums are absorbed more readily in certain diseased conditions of the alimentary tract.

As the infectious abortion of cattle is a condition which, although well known to veterinarians, has but recently appeared in medical literature, a discussion of the condition may be of value.

The *Bacillus abortus,* often referred to in the literature as the cocco-bacillus of Bang, was discovered in 1896 by Bang and Stribolt of Copenhagen.

Epizootic abortion has for the past century been the greatest curse with which stock-breeders and dairymen have had to contend. For nearly one century scientific men have recognized the contagious character of this disease, but thus far no advance has been made by way of combating contagious abortion either prophylactically or therapeutically.

With the dawn of the bacteriologic era began the hunt for the etiologic agent of contagious abortion. Men so eminent as Nocard worked on the problem not less than three years without being able to throw any light on its etiology.

The discovery of Bang[4] and Stribolt was soon confirmed

[2] Salge: Immunisierung durch Milch, Jahrb. f. Kinderh., 1905, lxi, 486.

[3] Die Durchlässigkeit des Magendarmkanals für heterologes Eiweiss bei ernährungsgestörten Säuglingen, Jahrb. f. Kinderh., 1913, lxxvii, 243.

[4] Bang: Ztschr. f. Tiermed., 1897, i; Maanedskrift f. Dyrlaeger, 1900.

by Stockman and McFaydean,[5] of Great Britain, and Nowak,[6] of Austria, and more recently the cocco-bacillus of Bang has been found in this country.

Bacillus Abortus Bang.

Bang's bacillus belongs to the smallest of the visible micro-organisms, measuring from 1 to 2 microns in length. It is a non-motile, non-spore-bearing cocco-bacillus, one diameter being only slightly greater than the other. It may readily be stained by any of the ordinary anilin dyes, but is Gram-negative.

The micro-organism in question will grow on any of the ordinary culture media after it has once been cultivated in the laboratory. Bang and Stribolt noticed that the growth of the *Bacillus abortus* appeared a few millimeters beneath the surface of the culture medium, and hence concluded that it was a semi-aerobe, developing only at such a point as presented a given oxygen pressure. These authors made the further observation that after this micro-organism had once been cultivated in the laboratory, succeeding generations thrived best in an atmosphere of nearly pure oxygen.

McFadyean and Stockman found that the *Bacillus abortus* could be cultivated successfully when grown in symbiosis with the *Bacillus subtilis*. These authors assumed that the *B. subtilis*, by absorbing a part of the oxygen contained in the closed chamber, created a favorable atmosphere for the development of the *B. abortus*. If the observations of these European authors are correct relative to the *B. abortus* in its relation to oxygen, we have here a phenomenon quite unique. It seems strange that an organism which in the first generation develops only under conditions of diminished oxygen pressure should swing to the opposite extreme in the succeeding generation.

There is another possible explanation of this, however.

All who have worked with this organism will agree that the growth of the first generation on artificial media is slow. The colonies, as a rule, do not appear until at the end of the fourth

[5] McFadyean and Stockman: Report of Committee to Inquire Into Epizootic Abortion, London, 1909.

[6] Nowak: Ann. de. l'Inst. Pasteur., 1908, xxii, 541.

or fifth day, and sometimes even eight to ten days may elapse before the growth becomes apparent. During this time the surface of the culture medium has a tendency to dry out and the growth appears deeper probably because of its demand for moisture.

We have further found that the *B. abortus* grows very well on the surface of ordinary slant agar, provided the tube is well sealed with paraffin to prevent evaporation. In a previous paper[7] we have expressed the view that this *might* be explained by the fact that agar absorbed a part of the oxygen contained in the tube, thus creating a favorable environment for the development of the *B. abortus*.

When Bang's bacillus has once been cultivated in the laboratory, it grows readily on any of the ordinary media.

The isolation of the *B. abortus* presents but few difficulties. It will, as a rule, be found in pure culture in the gastro-intestinal tract of the fetus, provided this is obtained within a few hours after it has been expelled.

Technic of Cultivation of B. Abortus.

The technic we employ is to inoculate tubes of slant agar, preferably ascitic agar or serum agar, from the gastro-intestinal tract of the fetus, and either seal the tubes with paraffin, or place in a closed flask together with a few tubes of slant agar freshly inoculated with the *B. subtilis*. On the fourth or fifth day, occasionally on the third day, the growth on the surface of the medium is apparent in the form of small dewdrop-like colonies, which at first remain isolated, but in the course of the next few days become confluent. The *B. abortus* does not coagulate milk nor liquefy gelatin. It produces neither acid nor gas on any of the sugar media. On potato it resembles very much the *B. malleus*.

It has until quite recently been held that the bacillus of Bang was not pathogenic for any of the laboratory animals, with the possible exception of mice. The work of Smith and Fabyean,[8] and Schroeder and Cotton,[9] shows that this organism is patho-

[7] Larson, W. P.: Jour. Infect. Dis., 1912, x, 178.
[8] Smith and Fabyean: Centralbl. f. Bakteriol., lxi, 549.
[9] Schroeder and Cotton: Leaflet issued from the Bureau of Animal Industry, 1912.

genic for guinea-pigs. Injected intravenously into pregnant rabbits or guinea-pigs, it will often interrupt pregnancy.

Smith and Fabyean[8] have recently found that, when injected into the peritoneal cavity of guinea-pigs, the bacillus of Bang produces lesions very similar to those of tuberculosis. They report observations made on fifty-eight guinea-pigs, and they found lesions in the following organs: lymph-nodes, spleen, liver, kidney, testicle, lung, bones. The eyes of some of these animals presented lesions in the form of an opacity of the cornea.

Fabyean[10] found further that the guinea-pigs thus affected were hypersensitive to a toxin extracted from the cultures of the *B. abortus,* even when injected in small doses, causing the death of the animals in from twelve to forty-eight hours, thus resembling the action of tuberculin when injected into tuberculous animals.

In the summer of 1911 we became interested in contagious abortion of cattle, and inaugurated studies of the disease as it affects bovines. Our work was directed mainly toward establishing the identity of the American and European diseases by the complement-fixation method.

Wall[11] and Holt,[12] working in the laboratory of C. O. Jensen, of Copenhagen, had found that contagious abortion of cattle could be accurately diagnosed by this method. We were able to confirm their work. We found that antigen prepared from cultures of the *B. abortus* received from Denmark fixed the complement in the presence of serum from an infected animal. Cultures which we isolated from infected material in this country were identified with the Danish organism.

We have, during the past two years, had occasion to examine the blood of several hundred animals and have found the complement-fixation method to be a very accurate means of diagnosing this disease.

Epizootic abortion is probably the most prevalent of all animal diseases. There is scarcely a dairy community where the disease has not at some time prevailed. Young heifers of the herd are first to become infected and abort. Once intro-

[10] Fabyean: Jour. Med. Research, xxi, 441.
[11] Wall: Maanedskrift f. Dyrlaeger, 1910, xxi.
[12] Holt: Maanedskrift f. Dyrlaeger, 1911, xxii, 1.

duced into a herd, it passes from animal to animal until nearly the entire herd has become infected. An animal will usually abort two to three years in succession, after which she is apparently immune, and when not made sterile by the disease, will carry to term. The abortions usually occur from the third to the seventh month of gestation. The general health of the animal is apparently undisturbed by an infection with the Bang bacillus.

It is generally supposed that the male element of the herd transmits the disease from animal to animal, but there is at present no definite proof of this. Culturers made from bulls of infected herds have invariably been negative; likewise blood examinations made on some fifty bulls have all given negative results.

Bang was able to cause cattle, sheep, and goats to abort by administering cultures of the organism per os.

Owing to the prevalence of the disease one would naturally expect to find the organism in milk.

In a study of the pathogenic organisms found in milk, Schroeder and Cotton accidently found the *B. abortus*, but for some time were not able to identify it. They injected milk as obtained on the market into the peritoneal cavity of guinea-pigs, and not infrequently found tubercle-like lesions of the abdominal viscera following such injections in about ten per cent of the animals thus treated. They finally concluded that the lesions were due to the *B. abortus*.

It has been pretty conclusively demonstrated that all of our domestic animals are susceptible to infection by this organism, although cattle are by far the most frequently affected. Bang found that sheep and goats would abort after being experimentally infected with this organism. Ostertag[18] isolated the organism from mares which had aborted. The usual laboratory animals are likewise susceptible to this disease. About one year ago we were forced to discontinue our complement-fixation work on this disease owing to the fact that fully sixty per cent of our guinea-pigs gave a positive reaction, in consequence of which their serum could not be utilized as complement.

[18] Ostertag: Kolle and Wassermann's Handbuch d. path. Mik.

Human Infection.

While we were making field observations, we took particular pains to make inquiries as to whether there had occurred abortions in women who had come in contact with a herd of cattle while an epidemic of contagious abortion prevailed. Such observations would naturally be of but little value unless one had the opportunity of observing the large number of cases. In the limited number we have had occasion to observe, we have recorded cases of abortion of the mother of the household where the ordinary causes, such as lues or injuries, could be definitely excluded. The results of our investigation along this line will be presented in another paper. Suffice it to say that in systematically examining the serum of women who have aborted, we have found that a larger number give a positive complement-fixation reaction using the *B. abortus* as antigen than when the ordinary syphilitic antigen is used.

Thus having evidence indicating that humans might become infected with this organism, we proposed to carry our investigation further in the hope of determining whether or not and to what extent the micro-organism in question might be of pathological significance to the human family.

As indicated elsewhere in this paper, the bacillus of Bang is somewhat difficult to cultivate, especially when found in impure culture. In view of this fact, the ordinary bacteriological procedures did not appeal to us as being the most desirable as exploratory measures; hence we then proposed to push our investigations further by means of the complement-fixation reaction.

From the work of Cotton and Schroeder we know that ten per cent of market-milk contains the *Bacillus abortus;* there can, therefore, be little doubt that any individual using dairy products is amply exposed to infection. Bang has shown that animals may readily be experimentally infected with this organism by administering it per os. If the *B. abortus* is pathogenic for human beings, as it is for guinea-pigs, and can be transmitted through the digestive tract as is the case with cattle, we would expect infants and children to be the subjects most frequently

infected. We have to date examined the blood of four hundred and twenty-five children by the complement-fixation method and have found at least some support of the above-expressed hypothesis. Of these four hundred and twenty-five cases, we found seventy-three positive and three hundred and fifty-two negative reactions. In other words, the blood of seventeen per cent contained antibodies against the *B. abortus*. The same technic was used as in the examination of bovine serums. In order to guard against every possible source of error, known positive and known negative bovine serums were invariably used as controls. Our work was not confined to the complement-fixation test, but agglutination tests were made in a large number of cases. We found in working with human serum, as did Holt with bovine serum, that the agglutination and complement-fixation tests run parallel.

To further corroborate the evidence that we were dealing with specific antibodies, other methods suggested themselves. In their work on hemolysis, Ehrlich and Morgenroth found that the specific hemolytic antibodies would unite with the washed erythrocytes when the latter were placed in the serum and left for a few hours. By centrifuging this mixture and decanting off the supernatant serum, they found that the latter had, by the contact with the blood cells, been depleted of the hemolytic antibodies. In other words, the antibodies had attached themselves to the blood-cells and been removed with these.

The same is true of the *B. abortus* antibodies. By treating a positive serum with a suspension of the Bang bacillus, the serum, after a few hours' contact, has been found to be negative when separated from the organisms by the centrifuge. If an adequate amount of complement is then added to the sensitized bacilli and incubated for an hour, the complement will become fixed, thus indicating further that we are dealing with specific antibodies.

It behooved us to prove that a positive serum could not be rendered negative through the action of various indifferent bacteria, such as members of the colon typhoid group, the proteus and pyogenic bacteria. During the course of this investigation, a large number of positive serums have been treated with one

or more of the above-named bacteria, but invariably with a negative result.

The one question which presents itself is: Are these antibodies in the blood of children the result of an active or passive immunity? This question we have found difficult to answer satisfactorily. We recall the experiments of Ehrlich,[14] in which he immunized mice against rizin and abrin, and later gave the young of the non-immunized animals to the immune animals and *vice versa;* he found that the young of non-immune mothers would become immunized against these poisons when allowed to suck the immune animals for a time. If the same law applies to the problem we now have under consideration, we could readily explain our positive reactions on another basis than infection of the individual.

The experiments of Ehrlich show very clearly that immune bodies are excreted in the milk and that these may pass through the mucous membrane of the intestine and reach the blood. Much and Römer, in studying this phenomenon, further conclude that the penetrability of the mucous membrane of the newborn from immune bodies is by far greater than that of adults. These authors found that the source of the milk containing the immune bodies was no insignificant element. The antibodies contained in milk of a homologous species were absorbed much more readily than when heterologous milk was given.

Attempts were made to demonstrate the *B. abortus* antibodies in milk from cows which had recently aborted, and whose blood serum fixed the complement in high dilutions. Our results have thus far been negative, as large quantities of milk interfere with the reaction.

Attempts to deplete the milk of any eventual antibodies by treating it with an emulsion of the Bang bacillus have likewise failed to give satisfactory positive evidence that such exist in milk. It is very probable that our positive reactions were the result of an active immunity; in other words, due to antibodies generated by the individual examined. It does not necessarily follow that the positive reactions were due to an active infection of the individual. The work of Mueller and others

[14] Ehrlich: Ztschr. f. Hyg., 1892, xii.

indicates that it is possible to immunize an animal by introducing the antigen per os or per rectum, provided large and repeated doses of the antigen are administered.

Importance of Human Susceptibility.

This discovery of so common a reaction in children opens up the opportunity for more study. We have first the problem as to whether this is a passive or active immunity. Then comes the question concerning the process of absorption together with further theoretical considerations.

To the pediatrist, it is of particular interest that inoculations of guinea-pigs with the *B. abortus* has been shown to produce lesions of the lymph-nodes, spleen, liver, kidney, testicle, lung, and bones, and that these lesions are suggestive, anatomically, of those of tuberculosis. These findings of competent observers, together with the experience that inoculation may produce epiphyseal enlargements, and our seventeen per cent of positive reactions among children with anatomical lesions of the osseous system, most of them with clinical diagnoses of tuberculosis and rickets, indicate very clearly the need of further investigation.

The President: "This work of Dr. Larson and Dr. Sedgwick is now open for discussion."

DISCUSSION.

Dr. Schroeder: "Mr. Chairman, Dr. Larson stated that Dr. Cotton and I had succeeded in causing this disease in guinea-pigs by injecting them. To this I wish to add that we also caused the disease in guinea-pigs by feeding them seemingly normal milk from apparently healthy cows that had become chronic carriers of the abortion bacillus.. Our discovery, that the bacillus of infectious abortion of cattle is of frequent occurrence in milk and that many cows are chronic carriers of this organism, may almost be characterized as an accident. We were not practically interested in studies relative to abortion disease of cattle when it was made, and the available descriptions of the abortion bacillus were so contradictory that some time passed before we were convinced that our bacillus was identical with it."

Dr. Ferguson: "I desire to express my appreciation of the great amount of work which this paper represents. It comes directly home to me, as a member of one of the largest Milk Commissions, and teaches us that in the future the Medical Milk Commissions must ever be on the lookout for these very diseases in cattle, which are liable to become infectious to children. We do not know when our herds may become infected, and this paper has expressed very forcibly the fact that we must always be on the lookout for this special disease."

Dr. McCleave: "We are all interested in this as showing how easy it is for this disease to get into a splendid, clean herd. We had in California a carefully gathered and protected herd of Jerseys. A year ago cattle from outside were bred to the bulls, and the consequence has been that within one year this entire herd has been ruined with these diseases. The owner is now obliged to destroy the herd, which is worth many thousands of dollars, and start entirely anew in building up another similar herd. This illustrates what might happen to any of our herds at any time."

Dr. Sedgwick: "I have nothing further to say than to draw attention to one or two minor points which we ran across in this work which show that something in this disease is carried over. Whether this lesion is so produced, we do not know; but in one of the childrens' wards in one of the institutions, where a large portion of them were tuberculous, our percentage of positive findings was much higher. Experimental work on the animals with the bacillus abortus shows that lesions can be produced similar to these, and it simply suggests again the necessity for more care in certifying milk."

Dr. Larson: "There is one point to which I wish to call attention: that is, the fact that farmers whose stock suffer from contagious abortion often inject carbolic acid in large quantities into the entire herd, working on the theory that it does no harm, but may do some good. They feel they must do something. Just what effect large doses of carbolic acid

may have upon the milk may be a question worthy of study. It is probably secreted by the milk glands to some extent, if not in very large quantities."

Dr. Schroeder read his paper on "An Experiment With Raw and Heated Cow's Milk:"

AN EXPERIMENT WITH RAW AND HEATED COW'S MILK AND ITS LESSON.

E. C. Schroeder, Superintendent, B. A. I. Experiment Station, Bethesda, Maryland.

In January, 1910, my assistant, Dr. George W. Brett, and I undertook an investigation on the relative value of raw, pasteurized, and boiled cow's milk as a food for unweaned animals. Experimental studies on this subject commonly have one or both of two weaknesses: the use of an insufficient number of animals, and an inadequate period of time during which observations were made; hence, Dr. Brett and I determined to use the largest number of animals we could properly handle, and to keep them under observation in all cases from birth until they died or reached adult life, and in some cases after they had reached adult life, to test their vital efficiency as far as this would be measurable by the number and vigor of their progeny during one year.

The animals selected for our investigation were guinea-pigs, as they were the only species of which a sufficient number of the proper age and a definitely known history could be obtained. We realized that the data derived from guinea-pigs could not be applied off hand to all species of animals that are at times fed on cows milk under artificial conditions as a substitute for mother's milk under natural conditions, but we assumed that they would have a fairly broad significance, especially as the main argument against the use of heat to destroy these disease germs with which ordinary commercial milk is too often contaminated, and which cannot be excluded unfailingly from milk that is produced with unusual precautions under exceptionally favorable conditions, is that milk contains important, thermolabile enzymes

and that its proteids and lime salts are modified by heat in a way that reduces their digestibility and food value.

If heat reduces the quality or the value of the milk provided by nature for the young cattle, it is not unreasonable to assume that this can be shown, as well or better, by tests with guinea-pigs, or animals that require food much like that of cattle, as with animals that are designed to digest food of a wholly different kind. The assumption, on the other hand, that cow's milk includes anything in its physical or chemical character, thermolabile or thermostabile, that has more value for infants than for the young of cattle or other truly vegetarian species of animals, on general biological principles, is hardly tenable, as nature cannot reasonably be supposed to provide through the mothers of one species of animals for the needs of the progeny of another wholly unrelated and distinct species.

From one point of view, guinea-pigs are not ideal animals for an investigation of the kind we made, and that is their remarkable development at birth and the short period of time during which they are dependent on their mothers for sustenance. But in this respect, calves and young guinea-pigs, if we take the respective sizes and lengths of life of cattle and guinea-pigs into consideration, are much alike. Both species are born with their eyes open and their bodies well coated with hair; both are able to move about with ease on their own feet a few hours after birth, and neither has a long period during which milk is an essential article of food. Guinea-pigs are weaned when they are about twenty days old, and calves when they are from five to eight weeks old. Hence, calves and guinea-pigs should be benefited more nearly alike by anything of a thermolabile character in cow's milk, or should suffer more nearly alike from changes induced in cow's milk through its exposure to heat, than calves and infants, or than calves and young animals that are less developed at birth and longer dependent on a milk diet.

The guinea-pigs used in the investigation—a total of four hundred and sixty-seven that were artificially fed on cow's milk—were removed from their mothers immediately after they were born and divided into three groups, as follows:

Group I, 155 guinea-pigs, fed raw milk.
Group II, 156 guinea-pigs, fed pasteurized milk.
Group III, 156 guinea-pigs, fed boiled milk.

As this large number of new-born animals could not be secured or properly handled at one time, notwithstanding that the guinea-pig breeding stock at the Experiment Station is abundant and prolific, the actual artificial feeding of young guinea-pigs extended over a period of ten months, from January to October inclusive. Each time new-born animals were selected from the breeding pens they were divided into three equal lots, and one lot added to each of the three previously designated groups.

The milk for the tests was obtained from Experiment Station, tuberculin-tested cows; in quality it was equal to or better than the best milk obtainable at any price in our cities, and none of it was more than eight hours old at the time it was fed to the guinea-pigs. The pasteurized milk was exposed to 60° C. (140° F.) for twenty minutes, and then rapidly cooled; and the boiled milk was slowly heated (in about ten minutes) to the boiling point, kept at that temperature one minute, and then rapidly cooled.

During the first twenty days of their lives the guinea-pigs were fed five times daily with a special nursing apparatus, consisting of a graduated glass tube, fastened to a wooden stand by means of screw clamps and communicating through a fine rubber tube with a nipple. The little animals quickly learned the use of this apparatus and showed as much affection for it as an artificially-fed infant shows for its bottle.

The amount of milk given at each feeding was one cubic centimeter. After the twentieth day a pan of milk was accessible to the guinea-pigs for ten days longer, and then all milk was withdrawn from their diet. From the beginning the animals had access to other food than milk, and most of them began to eat small quantities when they were only a few days old.

An attempt was made to do the same work with rabbits, but the death rate among them during the first ten days was so high that it was abandoned. Even when the young rabbits, which are born with their eyes closed and their bodies naked, were kept

in a soft nest in an incubator after removal from their mothers, most of them died before they were a week old.

The difference in the value of the three kinds of milk—raw, pasteurized, and boiled—was measured in two ways: by the mortality among the experiment animals, and by the average weight at different periods of the animals that remained alive. The following table gives the mortality record:

PERCENTAGE OF MORTALITY AMONG THE GUINEA PIGS.

Mortality During the	Young With Mothers.	Young Fed Artificially on Cow's Milk.		
		Raw.	Pasteurized.	Boiled.
1st 10 days.....	4%	27.74%	30.13%	27.56%
1st 20 "	5%	40.00%	46.16%	39.74%
1st 30 "	6%	44.52%	51.28%	42.95%
1st Year.....	14%	52.90%	53.85%	46.79%

The first column of percentages is based on guinea-pigs that were raised by their mothers in the Experiment Station breeding pens, from which all the animals for the investigation were derived.

The enormous difference in this table between the death rates of the guinea-pigs that remained with their mothers and those that were fed artificially on cow's milk, or the milk of a foreign species, is very impressive. The percentage death rate for the guinea-pigs left with their mothers is based on all the young born alive, weaklings as well as others, and no weaklings were selected for the artificial feeding tests. If we bear this in mind, the difference between the use of mother's milk under natural and of the foreign milk under artificial conditions will be recognized as really greater than the figures in the tables show it to be.

The difference between the results with the raw, pasteurized, boiled milk are in favor of the boiled milk. During the first thirty days of life there is no well-marked difference between the raw and boiled milk, and both unexpectedly have a better record than the pasteurized, which latter, however, seems to have left the animals alive at the end of thirty days in such condition that a sufficient proportion of them remained alive during the fol-

lowing eleven months to make the records for the raw and pasteurized milk at the end of the year practically alike.

The percentage mortality table, reduced to its simplest terms, means that, in four groups of new-born guinea-pigs, each of which was composed of 156 animals, 134 of the natural group were alive at the end of the year, while of the other three groups, only 74 raw, 72 pasteurized, and 83 boiled cow's-milk animals survived. The natural group is 51 animals—equal to nearly one third of the total number in each group—ahead of the boiled cow's-milk group, which latter is 9 animals ahead of the raw and 11 ahead of the pasteurized cow's-milk groups.

The better showing of the boiled milk must be considered with a clear appreciation of the fact that we are not dealing with ordinary commercial milk, but, on the contrary, with a milk of superlative quality.

The causes of death were mainly inflammation of the stomach and bowels, and pneumonia. The post-mortem examination of some of the animals that died very young revealed no satisfactory lesions to account for death.

The next table shows the average weight of the guinea-pigs in each group at different ages:

AVERAGE WEIGHT OF GUINEA PIGS AT DIFFERENT AGES IN GRAMMES.

Time of Weighing.	Young With Mothers.	Young Fed Raw Cow's Milk.	Young Fed Pasteurized Cow's Milk.	Young Fed Boiled Cow's Milk.
At birth.....	75.94	75.94	76.04	76.22
10th day of life....	127.34	116.27	118.37	119.35
20th " "	182.84	175.19	176.68	180.57
30th " "	234.65	228.81	230.04	233.71
50th " "	349.15	317.25	320.23	318.36
80th " "	502.29	422.16	427.17	430.49
110th " "	597.76	528.30	523.84	531.88
140th " "	671.56	587.81	596.72	592.43
170th " "	732.34	645.29	655.69	646.07
200th " "	776.63	697.12	700.15	699.14
230th " "	822.00	741.14	741.65	750.58
260th " "	858.84	789.48	781.61	795.42
290th " "	913.27	817.87	813.08	839.46
320th " "	944.07	853.81	836.15	879.71
350th " "	965.23	885.03	872.99	904.86
End of 1st year.....	974.29	895.51	888.40	920.86

The first column of this table is based on the average weight of one hundred guinea-pigs raised under normal conditions in the Experiment Station breeding pens.

It is remarkable how nearly the average weights of the guinea-pigs in the different groups correspond on the thirtieth day, or ten days after weaning. This is partly due to the fact that the weaker and less thrifty animals in the artificially-fed groups had been practically all eliminated by death before they were thirty days old, and that a much larger proportion of the weaker and less thrifty remained alive under natural conditions. After the thirtieth day the average weight in the natural group increased more rapidly than in the artificial groups, and at the end of the year shows a clear advantage of 53½ grammes over the heaviest artificial group.

As in the mortality records, the boiled milk weight record is distinctly better than that of either the raw or the pasteurized milk, and the pasteurized drops a little behind the raw milk.

It is not fair to base conclusions on such slight differences as we have in this investigation, both as to mortality and weight, between the raw and pasteurized milk animals, else one might be inclined to infer, with the better records for the boiled milk, that the milk of a foreign species, when it is used as food for unweaned animals, contains both desirable and objectionable thermolabile elements, and that the desirable elements, which we can well afford to sacrifice to be rid of the objectionable, are affected by lower degrees of heat than the latter. If the difference between the raw and the pasteurized milk was as great as the difference between the raw and the boiled, we would have satisfactory grounds for this inference. Incidentally, I would like to say that there are problems along this line regarding which we are very much in the dark, and that, apart from any treatment artificially-used milk may require because of its contamination with pathogenic or other micro-organisms, we have just as much evidence to support a hypothesis to the end that the milk of one species should be neutralized by heat before it is used as food for the unweaned young of another species as to support the more commonly entertained hypothesis that

the milk of one species contains thermolabile properties that are valuable for the young of another species.

From the guinea-pigs that were alive and well when they reached the age of one year, a number of males and females, fair representatives of each of the different groups, were selected and placed under conditions identical with those under which the Station's regular breeding stock is kept, and this gave us the data on which the following table is based:

BREEDING RECORD.

Guinea Pigs Raised on	No. of Males.	No. of Females.	No. of Litters.	No. of young.	Young born dead.	Young that lived less than 30 days.	Young alive at end of 30 days.
Mother's milk.....	5	15	62	210	12	11	187
Raw cow's milk.....	5	15	37	120	15	6	99
Past. cow's milk.....	5	15	52	170	15	8	147
Boiled cow's milk.....	5	15	52	177	11	10	156

The young were kept under observation until they were thirty days old, at which age there was no material difference among those from different groups of parents.

The table shows clearly that the artificial feeding of young animals on the milk of a foreign species imposes a handicap which may persist long after the milk-drinking period of life has been left behind. The naturally raised guinea-pigs show a greater productivity than the artificially raised, and again the boiled milk is more satisfactory than the raw or the pasteurized.

For the very poor record of the raw milk at this stage of the investigation, however, a fairly satisfactory explanation has been found, and this is based on the fact (discovered by Dr. W. E. Cotton and myself) that the bacillus of infectious abortion of cattle commonly occurs in the milk of infected, apparently healthy cows that produce healthy calves at full term.

While milk was being fed to our guinea-pigs, it was not known that one cow in the herd that supplied the milk was infected with the abortion bacillus, and I don't see how we could have

known or discovered or guarded against this condition. At the time it was not known that the abortion bacillus of cattle causes peculiar, almost unmistakable lesions in guinea-pigs, which develop slowly, rarely cause death, and gradually disappear. Neither was it known that the bacillus is eliminated from the bodies of infected cows with their milk, as it had never been demonstrated to occur in milk. Cotton and I had previously discovered the lesions of abortion disease in guinea-pigs inoculated with samples of milk from the District of Columbia supply, and in guinea-pigs inoculated with milk from one Experiment Station cow that was not in contact with the healthy herd, but we did not know the cause of the lesions. It was not till sometime afterwards before we isolated a bacillus from the lesions in the guinea-pigs, and another interval of time elapsed before the bacillus was positively identified as the etiological factor of infectious abortion in cattle.

The occurrence of the abortion bacillus in the milk of infected cows is now supported not only by the evidence supplied by Cotton and myself, but also by the work of Theobald Smith and Marshall Fabyean and others. In our work at the Experiment Station we have found ample reasons for believing that many if not most cows that become infected with the abortion bacillus remain chronic carriers of it for long periods of time—probably permanent carriers—and that the bacillus is of common occurrence in the milk of cows that have ceased to abort and have produced several normal, healthy calves in succession. We have records of two cows, one the mother of eight and the other of three calves, the milk of which was infected, though neither had ever aborted. Among aborting cows the bacillus appears in the milk before an abortion occurs, and in one instance was discovered in the milk of a cow that did not abort until two hundred and fifty-five days later.

It must be clear from this that the bacillus of infectious abortion of cattle is a factor we cannot afford to omit from consideration when our choice lies between the use of raw and heated milk. We don't know as yet what effect the bacillus has on human health, but we do know, if the general literature

on the subject is reliable, that it is pathogenic for widely different species of animals, and that it is a remarkable organism because of the long time it may linger in the bodies of its hosts with undiminished virulence, and that long periods of time may elapse between its entrance into the bodies of its victims and a manifestation of the disease it causes.

Infectious abortion has become so common among cattle, and seems to be spreading so rapidly, that I have come to the conclusion that its influence on animal industry, from the strictly economic stand, is even more to be feared than that of bovine tuberculosis. In a series of milk tests made at the Experiment Station, in which 516 samples of milk from 90 dairies were injected into 1,068 guinea-pigs, 103 guinea-pigs became affected with the abortion disease, and the milk distributed by 29 dairies was proved to be infected from time to time with abortion bacilli.

But to return to the breeding record of our guinea-pigs in the milk-feeding investigation. When the guinea-pigs were killed at the end of the investigation and examined post-mortem, it was found that several of those in the raw milk group showed lesions of abortion disease. Now, as abortion disease in cattle interferes somewhat with conception, it is possible that the smaller number of litters born by the raw-milk guinea-pigs may have been due to the same cause, although we are not sure of this. Only one among the fifteen raw-milk females used in the breeding tests showed lesions of abortion disease, and the infrequency of the disease among the guinea-pigs of the group generally indicates that the abortion bacillus did not become a factor until the milk-feeding part of the tests was near its end. Young born dead were no commoner, but formed a greater proportion of the total number of young produced among the raw than among the pasteurized-milk guinea-pigs. The slightly greater productivity of the boiled than of the pasteurized-milk guinea-pigs is important mainly because it gives us still another record in which boiled cow's milk is proved superior to raw and pasteurized milk as a food for young, unweaned guinea-pigs.

The first lesson the investigation teaches is that the artificial use of the milk of a foreign species as a food for unweaned



Illustration No. 1.—Mother guinea pig with young.



Illustration No. 2.—Apparatus with which young guinea pigs were artificially fed on cow's milk.



Illustration No. 3.—Young guinea pig being fed artificially on cow's milk. The feeding was all done in fly-proof cages.

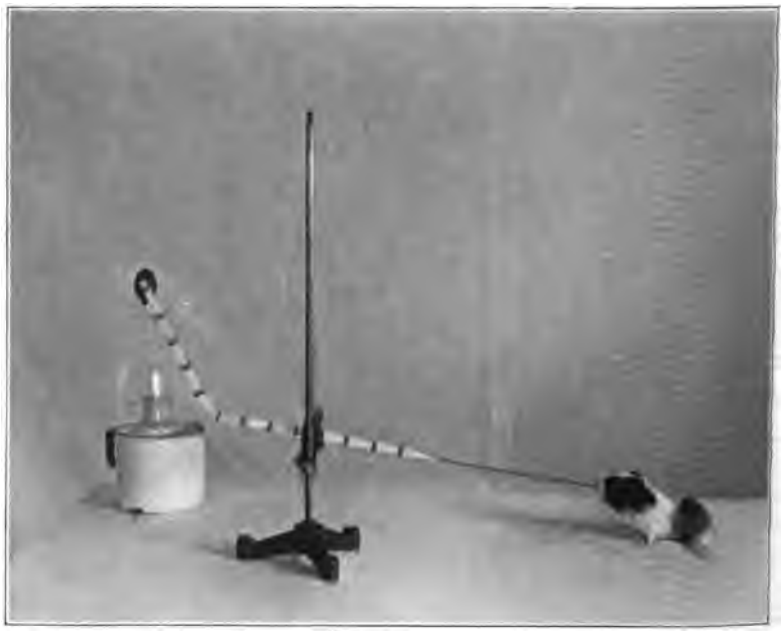


Illustration No. 4.—A young guinea pig that is thoroughly acquainted with its artificial foster mother.

animals is a more lasting handicap than it is generally believed to be. The human organism is infinitely more complex than that of the guinea-pig and may, therefore, suffer in many ways that cannot be demonstrated by tests with guinea-pigs.

The second lesson is that it is constantly becoming more and more apparent that we lack the means to produce cow's milk that is constantly free from pathogenic agents, just as the number of instances are increasing which prove that seemingly healthy individuals often are dangerous disseminators of disease germs.

And the third lesson is that the time has come to ask, when a foreign milk is substituted for the milk natural to the species, whether the modifying effect of heat, irrespective of the treatment living, pathogenic contaminations require, may not be beneficial rather than objectionable?

Finally, it is my sincere hope that no one will conclude from my paper that I undervalue the magnificent work of the American Association of Medical Milk Commissions. Milk is a cause of much disease, and there are several kinds of milk that are responsible for this charge. Dirty, stale, adulterated, or otherwise objectionable milk—raw, pasteurized, or boiled—is and remains a menace to health. Heat applied to milk is not a renovating, rejuvenating, or a cleansing agent; all we can expect of it is to neutralize those specific germs of disease that find their way into milk, which is the best culture medium for bacteria among all articles of food, in spite of our utmost care to exclude them.

Infected milk? Unless I am greatly in error, I believe those who have studied the question impartially cannot be far from the conclusion that the infants who must, unfortunately, be fed artificially on cow's milk or the milk of a foreign species, and invalids whose diet is restricted as a whole or in part to milk, should receive properly Certified Milk efficiently pasteurized, and that the general milk supply should be made as good as the economic conditions affecting the production and handling of milk permit, and should be properly pasteurized under official supervision.

The President: "This paper of Dr. Schroeders' is now open for discussion."

Dr. Van Derslice: "This certainly is a most valuable paper. I was thinking how valuable it would have been if we could only have compared that with milk sold in the market. The author has demonstrated that boiled milk is far superior to pasteurized milk. Early in the pasteurization crusade, we took the stand that if one hundredth part of the energy for propaganda had been expended in the education of the mother to boil the milk in the home as was spent on the propagandizing of the pasteurization fad, we would then feed the child a much safer milk than a commercially pasteurized milk was, is, or ever will be. While I believe that this is a very valuable paper, I can see how the adherents of commercial pasteurization can use it with good effect to further their ideas for commercial pasteurization."

A Member: "There is one question in these experiments and which has been very clearly expressed in some other papers. That is, that these guinea-pigs, in addition to receiving boiled and raw milk, also took other food, so that a great many objections that have been made to boiled milk cannot be made here for the simple reason that they receive additional food, grass, and other things, and certain salts from vegetables which we know play such an important part in the nutrition of infants and children that babies fed upon raw and pasteurized milk do not receive. If we could feed the babies with the additional vegetables, then this question would be settled immediately; but we feed babies exclusively on milk, and it has been shown again and again that the strongest and healthiest babies are those fed upon raw or nearly raw milk."

Dr. McCleave: "I have been to a very large extent having my mothers boil even their Certified Milk when they are feeding it to their babies, rather than giving it to them raw. I invariably tell my mothers with babies, and with older children, too, under no circumstances to give them uncooked milk. It is an almost unknown thing in my practice for

children not to get Certified Milk, and only in cases where they are going outside the district where Certified Milk is obtainable. I would ask our Commission people what they would think of the proposition of doing efficient pasteurization in the bottles as an additional safeguard for Certified Milk. I think the time will come when we will cease to use raw milk—even when certified—in the feeding of infants. As Dr. Van Derslice has pointed out, there are certain hypothetical objections to the use of cooked milk which can be overcome by the addition of cereal decoctions and vegetable juices to the dietary of infants. From all the evidence gathered from year to year as to the harmfulness of raw milk and the harmlessness of cooked milk used so universally on the continent of Europe, where they have equally good children with ours, the time is coming when we will use more and more cooked milk, and less and less raw milk, even when certified."

Dr. Ludlum: "I think that Dr. McCleave's remarks bring out one question there. He talks about efficient pasteurization in the bottle. Now, my personal belief is that there is no such thing as efficient commercial pasteurization. Dr. Rosenau, of Harvard, has concluded from careful tests that our holding method of efficient modern commercial pasteurization is not efficient. Pasteurization in the bottle I have seen performed, and it does not impress me one half as well as the holding method over the round coils with the hot water going over. Why do it? Why stop half way? Either stand for raw milk, or boil it in the home. The place to cook it, if at all, is as close to the baby as possible, so it shall not get dirty again afterwards."

Dr. Coit: "I do not always agree with Dr. Van Derslice, but I want to ally myself with him in this matter of heating milk. I recognize the immense value of the work of Dr. Schroeder. I want to claim the honor of getting Dr. Schroeder into this circle. One of the most gratifying things in my experience of a quarter of a century in the use of milk is that I can cook milk and get my results. The experimental re-

search made by the Local Government Board of Great Britain, just published in two reports, is illuminating; the work done by Dr. J. A. Lane-Claypon, in Berlin, on three hundred babies, fed on boiled cow's milk with controls of breast milk, the balance of the results being in favor of boiled milk. I have cooked more milk for infants than I have used raw milk. I want milk efficiently certified, and then I want to be able to cook it. I shall not extend this discussion further than to say that we must have two things: efficiently Certified Milk and lower grades of milk efficiently cleaned by heat; the latter I call refining. Some years ago I coined the term "milk refiner," as applied to an apparatus used for the cleaning up of milk. We can refine gold and silver, and there is no reason why we cannot refine milk."

The President: "I should like to go on record as saying that I think boiled Certified Milk is better food for infants than raw milk. If there is no further discussion, I will ask Dr. Sedgwick if he can say anything more to us on this subject."

Dr. Sedgwick: "There is one question I should like to ask, as to the time of boiling. As Dr. Coit does, I personally boil Certified Milk three minutes. I did not hear Dr. Schroeder state the time that the boiling was carried on in his experiments, and I think that would be of great interest to us."

Dr. McCleave: "I would like to correct in a measure what I said and some one else has referred to as efficent pasteurization. When I use the term 'efficient pasteurization' in the bottle, I mean the steam sterilization of the milk in the bottle—not pasteurization as we understand it to be used nowadays in a commercial sense. In that I agree as heartily as possible with Dr. Van Derslice, that that is an unreliable procedure."

Dr. Schroeder: "The boiled milk used in our investigations was brought to the boiling point in about ten minutes, and then actually boiled one minute. I am sure the results

would have been the same if the milk had been boiled from three to five minutes. The available data on the relative value of raw and boiled milk as food for unweaned animals shows, when the milk of one species is used as food for the young of another, that such differences as can be recorded are in favor of boiled milk. This is of great importance, because most of us know that it has been conclusively demonstrated that it is close to impossible to produce milk which is absolutely safe for use in its raw state. I wish especially to indorse Dr. Coit's statement to the effect that we should not stop half way at 'pasteurization,' but should go a step further and 'boil.'"

Dr. Coit: "I have on my ticker records of nearly two hundred and sixty cases of scorbutus; twenty-five per cent of them never had anything but raw milk. Scorbutus is not due to the boiling milk; it is an exudative reaction caused by the presence in the system of some products of food decomposition toxic in character, resulting from poor feeding and bad hygiene."

The President: "The meeting to-morrow morning is to be a meeting with the Section on the Diseases of Children. The meeting is to be at 9 o'clock in the morning, in the Physics Building, on the old campus, where the Section on Diseases of Children has been meeting."

Dr. McCleave: "It was brought up in reference to the business section, that the election of officers would have to be held, according to the Constitution, on the afternoon of the first day's session. An examination of the Constitution proves that that is so. The session must be held on the afternoon of the first day. This is the afternoon of the first day. I presume, as a matter of fact, that from noon until midnight is at least the afternoon of that day; and, therefore, if the point brought up by the gentleman in the early part of the evening is correct, we should have a business session to-night, or we should at least convene and adjourn definitely until

to-morrow afternoon, to be in accordance with our Constitution."

Dr. Van Derslice: "I would suggest that if there is any one on the program for Thursday afternoon who is here, and who is not going to be with us to-morrow, that we would be glad to hear his paper at this time."

Dr. McCleave: "I will make my motion that, on the adjournment of this scientific session, a meeting be called of those who are representatives of the Milk Commissions, to meet and adjourn promptly until to-morrow afternoon, for the transaction of business, to put our records straight. That is, we must at least meet as an executive session to-night; otherwise, we would not be acting in accordance with our rules."

Dr. Van Derslice: "Second the motion." Carried.

A Member: "Do I understand that the program given for Friday afternoon will be the joint program of to-morrow morning?"

Dr. Coit: "The program for Friday morning is to be given to-morrow afternoon."

The President: "Gentlemen, you have heard the report of the Council, and if there is no objection we will go ahead with the election of these officers that the Council recommends."

Dr. Ludlum: "I believe the report of the Council was received and placed on file. I do not recall whether there were any recommendations that we did not want to adopt, but I move you, Mr. Chairman, that the recommendations of the Council be taken up seriatim for action."

The motion was seconded.

The Secretary: "Do I understand this to mean that we go over every bit of the action of the Council in detail?"

Dr. Ludlum: "Yes, that is what I mean, because there are some things which were gone over so fast, and simply received, so that action could be taken later, as I understand. I don't know that there is anything subject to criticism, but I think we ought to go over the recommendations with more care and detail."

The President put the motion. Carried.

The Secretary: "The first matter is the Harrisburg meeting, and the application of the Buncombe County Medical Society. Shall we pass on that?"

Moved and seconded that this Commission be recognized on the part of this Association. Carried.

The Secretary: "The next matter is a letter of resignation from Dr. Hamill as Treasurer, also Dr. Hamill's report as Treasurer."

Moved and seconded that Dr. Hamill's report be accepted. Carried.

The Secretary: "The next is the instruction of the Secretary to advise all Commissions and individuals who have been derelict in their dues, that their membership in the Association will lapse and their names be dropped from the roster of the Association if favorable answer or intention to meet the dues is not received."

Dr. Ludlum: "Has that been done. I don't think we have received a statement of account, and we are not looking for a chance to overpay. I don't know whether anything has come due against us or not, or whether accounts have not been sent out. Is that due to Dr. Hamill's illness, probably, that the work has been delayed?"

The Secretary: "I think perhaps you misunderstand. This means derelict in the sense that we have a list of the Commissions who are derelict for four or five years, and individual members who are also derelict."

On motion, duly seconded, this was passed.

The Secretary: "Next is the matter of Dr. Kerr's recommendation and list of honorary memberships for the Association. There is no report."

Dr. Ludlum: "Is that wise or necessary, with the Constitution and By-laws providing for three classes of membership—guests, individual members, and Commission members? There is no provision in the Constitution and By-laws, unless I am mistaken, for honorary members; and if that recommendation is to be carried out, it requires an amendment to the By-laws."

The Secretary: "It stands automatically for a year."

The President: "It might be well to recommend that we amend the By-laws at this time to include honorary members."

The Secretary (reading): "'The Council authorized the expenditure of a sum not to exceed fifty dollars for an exhibit. . . . The President of the Association, on motion, was instructed to appoint delegates to the Congress on School Hygiene in Buffalo, August 25-31. . . . Action on the invitation from San Francisco for the 1915 meeting was deferred. . . . The resignation of Dr. T. Y. Sutphen, of Newark, New Jersey, was received and accepted. . . . The President was requested to invite guests to the meeting at Minneapolis. . . . The Council then admitted to the meeting Dr. B. Thomas Whitmore, of Lakewood, New Jersey, who presented a plan for the publication of a monthly journal devoted to clean milk. It was Dr. Whitmore's idea that in no better way could the cause of the Medical Milk Commission be furthered, that the extension work of the Association would be definitely helped, and that ultimately quite an income be derived from such publication. This journal to be directed not only to the profession, but to the laity as well. The plan was presented in written form. The matter was fully discussed, but no action was taken. Copies of the recommendation of Dr. Whitmore were ordered sent to the members of the Council for future deliberation. . . . Adjourned.'. That finishes

the minutes of the meeting of June 6. Do you wish to adopt that as a whole?"

The President: "Any objection to this? If not, they will stand approved, as correct." Approved.

The Secretary: "On June 19, 1913, the Council recommended that the next meeting be held in Rochester, previous to the meeting of the A. M. A. . . . Recommends for membership Buncombe County Medical Association, Asheville. . . . Recommended to the Association the resignation of Dr. Hamill as Treasurer. . . . Nominated the following as officers of the Association for the year 1913-1914: For President, John W. Kerr, Washington; for Secretary, Otto P. Geier, Cincinnati; for Treasurer, Dr. J. P. Sedgwick, Minneapolis; for Council (to take the place of Dr. Coit), Richard Smith, of Boston; (to take the place of Dr. Kerr), Alfred Hand, of Philadelphia."

Dr. McCleave: "With reference to the selection of Dr. Kerr's name for President—while the selection will be amply justified by Dr. Kerr's work in behalf of pure milk, and particularly in this Association, I think it would be well to state to the members of the Association the particular fitness of this selection of Dr. Kerr for our President for the ensuing year. Dr. Kerr has been appointed as a representative of the United States at the International Congress to be held in London, and the English-speaking Conference on Infant Mortality. He goes as the representative of the United States Government to these conferences, with particular instructions to present there the pure milk movement in this country, and we thought it would add to his prestige if he could be known there as the President of this Association."

The President: "We can now proceed with the election of the officers. First will be the election of President. I will appoint Dr. Meyers and Dr. Van Derslice as tellers. This election must be by ballot."

A Member: "Any one who wishes, of course, may nominate any others?"

The President: "Chapter 4 of Article I on Nominations may be read from the floor."

(The Secretary here read Article 1, Chapter 4.)

Dr. Ludlum: "In view of the fact that there is only one nomination made, I move that the Secretary be instructed to cast the ballot for Dr. Kerr." (Carried.)

The Secretary cast the ballot for Dr. Kerr, who was thus unanimously elected President for the coming year.

The President: "Nominations are now in order for Secretary. The Council has recommended Dr. Geier. Any more nominations from the floor?"

Dr. Ludlum: "I move that the nominations be closed, and that Dr. Van Derslice be instructed to cast the ballot for Dr. Geier."

Dr. Coit: "Mr. President, may I speak to the motion?"

The President: "Yes."

Dr. Coit: "I think the Council had in their minds the possibility of aiding the efficiency of this Association work by giving Dr. Geier some assistant. Dr. Geier now holds a very important municipal position, which causes him to devote some of his time to that. His time is thus divided between that work and the work of this Association. This Association work has not suffered, because other members of the Association have done the work that Dr. Geier has been unable to do. Correspondence with members has been materially enlarged. It seemed to the Council that it would be a great advantage to the Association if Dr. Geier should have an assistant. The Constitution does not provide for an Assistant Secretary, but it seems to me that we could authorize Dr. Geier to appoint an assistant to himself; that would not make a new office, but it would be putting another man in training, so that when the inevitable time arrives we would have some one upon whom Dr. Geier's mantle might fall. I wish this Association might in some way fix it so that Dr.

Geier could have the assistance of a very efficient man in Cincinnati whom he can tell us about. I should like to hear from Dr. Geier."

The President: "Any more nominations for Secretary? It has been moved and seconded that Dr. Van Derslice cast the ballot in favor of Dr. Geier for Secretary the ensuing year." (Carried.)

The President: "Is it the pleasure of the meeting that Dr. Geier be empowered to procure for himself an Assistant Secretary, with some recommendation from this Society?"

The Secretary: "There is not much to be said about this thing, except that this is an annual difficulty, to find some one to do this work. It is a pity that the Association should be injured in any degree because I am unable to give it the service it deserves. It has occurred to me that a solution would be to train some man to do the work. A man I have in mind is now associated with the Cincinnati Milk Commission. He is enthusiastic about the work, and is now in the office, doing the clinical work in the Milk Commission's laboratory. I feel that if he does it, he should be given some official recognition by the Association."

Dr. Ludlum: "I move that Dr. Geier's friend, Dr. Graf, a member of this Commission, be appointed Assistant Secretary for the ensuing year."

Seconded. Carried.

The Secretary: "The next name that appears is the nomination for Treasurer—Dr. J. P. Sedgwick, of Minneapolis."

Dr. Ludlum: "I move that the nominations be closed, and that the Secretary be instructed to cast the ballot for Dr. Sedgwick as Treasurer. And if it is not out of order at the present time, I would also move that Dr. Sedgwick be given the heartiest thanks of the members for his work in this Association."

The motion was seconded. Carried.

The Secretary was instructed to cast the ballot for Dr. Sedgwick.

The Secretary: "The next is the nomination of Richard Smith, of Boston, for the five-year term, beginning 1913 and ending 1918, as a member of the Council."

A Member: "I would like to nominate Walter D. Ludlum, of Brooklyn, New York."

Dr. Van Derslice: "I would like to ask if Dr. Smith is here. I would like to ask if Dr. Smith is registered as a member here."

(Miss Cregmile answered this question.)

Dr. Van Derslice: "I would like to ask if, in the memory of any member of the Commission now present, Dr. Smith has ever attended a meeting of this Association before?"

Dr. Coit: "He comes as a member and representative of one of the most efficient Medical Milk Commissions. I am not able to say, but I think he was present at the Philadelphia meeting. He was not at Louisville. The Boston Commission has never had any representation in the work of this Association, and the Council seemed to think that Boston had a right to recognition, because Boston has two very excellent Commissions that have been at work for a good many years."

Dr. Van Derslice: "We have with us here members who have attended and whose Commissions have sent their members here from the beginning of the Association of Medical Milk Commissions. I do not believe there has ever been a meeting any place in which there was not a member of the Chicago Medical Milk Society present. I don't believe there has ever been a meeting, from the first meeting on, in which the Brooklyn Commission has not been present. Further, I want to state that never in the history of the Chicago Medical Society Milk Commission has there been a member who has been requested to give a paper before the Association of Medical Milk Commissions. There has never been a member

of the Chicago Medical Society Milk Commission on a committee of the Association of Medical Milk Commissions. Nor has the Chicago Medical Society ever had a member elected from it to an office in the Association of the Medical Milk Commissions. In justice to the Brooklyn County Medical Society, I want to second the nomination of Dr. Ludlum."

The President: "Any more nominations for this five-year term in the Council?"

Dr. Sedgwick: "I move that the nominations be closed."

Seconded. Carried.

The President: "The nominations are closed. There are two names proposed for this five-year term, Dr. Smith and Dr. Ludlum. The tellers will pass the ballots for the votes, and while we are voting on this question, it might be well to take up the next question."

The Secretary: "For the two-year term, just vacated by Dr. Kerr being elected to the presidency, the Council recommended the name of Alfred Hand, Secretary of the Milk Commission of Philadelphia."

The President: "Any other nominations for this two-year term?"

Dr. Van Derslice: "Mr. President, so far as I know, there has never been a time in the history of the Association of American Medical Milk Commissions in which the Philadelphia Medical Society has not had one or more members on the official board. I therefore urge in fairness that the Chicago Medical Society have some recognition. I nominate the Secretary of the Chicago Milk Society Milk Commission, Robert A. Black, for the two-year term in the Council."

Dr. Ludlum: "Second the motion."

The President: "Let there be no confusion. The present ballot is for the five-year term, Dr. Smith and Dr. Ludlum. Are there any more nominations for the two-year term?"

Moved and seconded that the nominations for members of the Council for the two-year term be closed. Carried.

The Secretary: "While we are waiting for the report of this, I would like to read the last recommendation of the Council: 'The Council further recommends that the Secretary of Agriculture be requested to make a survey of all dairies and products under the supervision of the Milk Commissions for the purpose of determining the efficiency of the supervision and the results thereof. This same to be used as a basis of a report to the meeting of this Association next year.'"

Dr. Ludlum: "There is a very grave danger, in my mind, that this Association may go beyond its functions. I am not prepared definitely to oppose that matter, neither to confirm it. At present, though, my feeling is one of opposition to it—not so much from any danger of damage which may be incurred, but it seems to me to go beyond the province of this Association. This Association puts itself on record, if it adopts that, as criticising its members. This Associaton is a voluntary body, banded together. It has no authority absolutely over any member of its own Commissions, or any one else, and it should not have. It is merely an advisory body. This Association is a voluntary body. It should advise; it should not compel. Now, the Medical Milk Commission is appointed in a majority of cases, and presumptively should be in all cases, excepting under State laws over which we have no control—should be appointed by a medical society, and should be amenable to control by the medical body. To put this investigation into the hands of a non-medical body, under a commission under the Department of Agriculture or under a layman, it seems to me absolutely improper. I move that the recommendation of the Council be laid on the table until next year."

Motion seconded.

The Secretary: "It is the result of my recommendation that the Council makes this recommendation to the Board. I feel very strongly that we should have this housecleaning—if out of such an investigation a housecleaning will come. I know of nothing so embarrassing to the Secretary as the

insinuations continually being cast around the country that this Association or that Milk Commission is doing inefficient service. It is unfair to the good Commissions to have that scurrilous talk going around. If the gentleman who has just spoken would be in the central position that I have been in to hear those attacks, and realize that his Commission is being attacked, as well as the Cincinnati Commission, when that broad assertion is made against the Milk Commission movement, he would appreciate that we must and should have some one; and the only way at present in which this Society can secure such service is from the United States Government. We want to standardize our results, and know what the other man is doing and how our work compares. I certainly trust that this Association will not take the contracted view of it and refuse to abide by this suggestion, because it seems to me that it is laying ourselves open to the criticism that we have something to cover up, and I for one don't care to have that said about the Cincinnati Commission; nor do I, as Secretary, care to have that said about the component parts of this Association. When Dr. Ludlum says that this central organization has no responsibility or control over the component Commissions, he is again wrong. Unless our membership can in a friendly spirit come together and co-operate, co-ordinate to the point of making Certified Milk mean something in this country, then we had better notify the members not in harmony to withdraw from this Association."

Dr. Van Derslice: "I would like to ask Secretary Geier how many times the Chicago Medical Milk Commission has been brought to his attention, how many times it has been criticised."

The Secretary: "Do you mean recently, or before it was reorganized?"

Dr. Van Derslice: "The Chicago Medical Milk Commission was never reorganized. It is the only Milk Commission, according to the definition laid down in the standards of the

Association of American Milk Commissions which Chicago ever had under the Chicago Medical Society. And that milk was the first milk that was ever produced—".

The Secretary: "Isn't that quibbling a little bit?"

Dr. Williams: "I rise to a point of order. The discussion is not pertinent to the motion."

Dr. Van Derslice: "It is pertinent as to the man who opened the discussion against the motion."

The President: "The Chair rules that this is a motion to lay this resolution on the table, and is undebatable, and will put the question. It has been moved and seconded that this resolution be laid on the table. Those in favor—"

Dr. Van Derslice: "If you will allow the discussion to take place on this thing, it seems that we might as well come to the carpet now as any time."

Dr. Ludlum: "It seems to me this is too large a matter for this Association to settle at this time. I should like to ask the Secretary how many of the sixty-eight Medical Milk Commissions—if that number is correct—in this country are represented at this Association meeting at this time. It seems to me presumptuous on the part of one or two or three to take action which may bind the work of protection on Certified Milk for an indefinite time. My feeling is that this is too important for a representation of no more than six or eight—there are not more than eight to take part—how many Commissions are represented at this meeting?"

The Secretary: "Probably nine or ten."

Dr. Ludlum: "Then this is too small a proportion, if that is correct. That is the reason, in my judgment, that it should be laid over another year. There is no necessity to take it up at this time. I know there are criticisms of management, and quibbles have been raised, and question raised in the method of investigation and conduct of these various Commissions.

I am frank to admit that the Commission I represent operates under an entirely different method from certain others, and I am willing to stand by the method—which we expect to improve, as we have, from year to year—under which we now operate. I have no doubt that the Commission I represent has also been the subject of criticism, and doubtless unfavorable criticism, in the conferences of this Council. I think we might as well pass my motion, or vote on it; it won't take half a minute to do it, and I am ready to discuss the original recommendation of the Council, if my motion is thrown down. I should like to have a vote on my motion that this should go over another year."

The Secretary: "The whole thing is unparliamentary, that we should allow this discussion. I only request again that we do not procrastinate on this subject. That is just what we are suffering from now—this eternal procrastination about the things that should have been done before. I simply say this as a means of getting some information to lay before the Association, and to assist the individual Commissions in doing their work."

By rising vote, the motion was lost, ten to seven.

Dr. Van Derslice: "Now, Mr. Chairman, let's get right out on the carpet. In the Chicago Medical Society there have been some political pow-wows—"

The President: "Do you desire to make a motion?"

Dr. Van Derslice: "No. There is now the recommendation of the Council before the house, and I am speaking to that."

The President: "You are speaking on this resolution?"

Dr. Van Derslice: "On this resolution."

The President: "Have you a motion to propose?"

The Secretary: "You have it before you now."

Dr. Van Derslice: "The motion to lay on the table was lost. What will we do with this resolution? If it is not before the house, the motion to table was out of order. You can't table a thing that is not before the house."

The President: "This resolution was before the house, and it was moved that it be laid on the table. The resolution is still before the house. In order to bring it before the house to vote on, a motion will be necessary."

A Member: "I move that it be adopted."

Seconded.

Dr. Van Derslice: "The reason that I asked Secretary Geier about it—and I am sorry he did not come and tell me—is because I do know, Mr. Chairman, that the officers of the American Association of Medical Milk Commissions have criticised the product of the Chicago Commission; and we have, in every way possible, tried to ask the American Association of Medical Milk Commissions what we have been doing. We have done something that practically no other Milk Commission does. We print the entire contract with all the requirements that are necessary to make Certified Milk; on our list of examiners and inspectors we place the names of Professor Troudere, Ralph Webster, J. W. Viers, and Professor Jordan—men who regularly examine the product of the Chicago Medical Society Milk Commission. So far as this question is concerned, we have nothing to do with it, because you will bear me out that at the supper time I tried to make arrangements with Mr. Kelly to have our farms inspected. The Government has made regular inspections of our farms for three years,—I cannot, offhand, tell you the number of inspections of our farms the Government has made, but it would probably average two or three every twelve months. The medical inspection of employees has been taken up by Dr. Merrill herself. She has gone out and taken the swabs from the throats herself. She has brought down the cultures to the Chicago laboratory—a laboratory that stands

without question in its reputation—and the recommendations of that laboratory have been taken every time, without any other question. The laboratory recommendations,—we had a case in point in which three examinations were made within the last few weeks."

The Secretary: "I rise to a point of order. Is the doctor talking to the motion? It seems to me we are getting the personal history of the Chicago Commission, and no one has mentioned the Commission. The reason I did not answer the doctor is because it is of no particular importance to me, as Secretary, whether the Chicago Commission, or the Los Angeles Commission, or the Louisville Commission is criticised."

The President: "The Chairman rules that the point of order is well taken, and if the member wishes to talk on this motion—"

Dr. Van Derslice: "I ask for personal privilege. Dr. Geier says that we have been criticised."

The President: "The motion on this resolution is up now, and if you have no discussion, we would like to vote on the motion."

Dr. Van Derslice: "Mr. Chairman, you can rule that way; you are right in your ruling; if you want to stick to parliamentary rules, nobody will question it; but you are not doing justice to the Association of Medical Milk Commissions, which you intend to do. No one questions your fairness, but the point is this: I tell you, I know these men have criticised the Chicago Medical Society Commission, I said, let's get right out on the carpet."

The President: "The Chairman will have to insist upon his ruling."

Dr. Van Derslice: "All right, all right."

Dr. Ludlum: "Can we hear the resolution read again?"

(The Secretary read the resolution: "The Council further recommends that the Secretary of Agriculture be requested to make a survey," etc.)

A Member: "In Saint Louis we have our troubles, and our improvements, and I am perfectly willing for the Government to investigate. I am very sure that we want to stand well, and I am sure we will. I am perfectly willing that the Government should inspect. Let us have that investigation."

Dr. Van Derslice: "I am in favor of it. Let us adopt this resolution."

Dr. Zahorsky: "One of the serious difficulties that this Association is laboring under—the conditions which are largely imaginary, in my mind—which exist between the producers and the Commissions. If this survey were made, it would do away with the necessity very largely, in my mind, of the producers coming to us each year, requesting that the standards be adjusted and that there be such definite understanding as to what constitutes Certified Milk that it shall mean the same thing in all communities. If we had such a survey, I think it would clarify the situation and make it plain to us and to them that Certified Milk should mean the same in Chicago as in Montclair, or in Saint Louis, or anywhere else."

Dr. Ludlum: "I rise to a point of order. Is this apropos to that motion?"

Dr. McCleave: "I wish that this Association had the money to keep a paid representative in the field who should travel from Commission to Commission, making just such an investigation as we have in mind at this time, instructing the weak Commissions on the points in which they are weak, and helping new Commissions to work properly, and so on."

Dr. Coit: "The chief aim of this Association, as I infer from Dr. Geier's original proposition, is that Certified Milk shall be uniform everywhere in quality, in purity, and in

safety; and I think we want to realize that every word Dr. Geier has said is true, coming from the middle of his heart, and I believe that the medical profession and the public of this country demand that "Certified" Milk be certified in fact and not in name only, as it is in many places."

The President: "Those in favor of the motion, say 'Aye;' opposed, 'No.'" Carried.

Dr. Van Derslice: "I rise to a point of personal privilege."

The President: "We are electing officers now, although this discussion was brought in at this time. Let us hear the report of the tellers."

(The vote for the five-year term member of the Council was announced as nine votes for Dr. Smith; Dr. Ludlum, nine. Vote declared a tie, and new vote taken.)

Dr. Van Derslice: "I rise to a point of personal privilege."

The President: "Is it pertinent to this—"

Dr. Van Derslice: "It is pertinent to this. I will put my question to you in any time you want to give me."

Dr. McCleave: "I am in sympathy with the Council, and in the rights of these gentlemen and the rights of their Commissions. I do not want to deny them the privilege of the floor, but I understand that, by the rules, a point of personal privilege takes precedence over everything else. If the Chair rules against Dr. Van Derslice, he has the right to appeal to the house."

The President: "Dr. Van Derslice has the floor."

Dr. Van Derslice: "Dr. Geier believes in the standardization of Certified Milk. The Chicago Medical Society stands for the propaganda of clean milk and encouragement to make clean milk wherever you can. Instead of having these matters taken up in your regular meeting, we ask only for a minority representation on your Board in order that we may take this matter to the Council, where it belongs."

Dr. McCleave: "It is true that last year at Louisville we all know there was a certain opposition developed to the work of the Council—and I can say that without any prejudice because I was not then a member of the Council—which seemed to center around the Chicago Commission and around the Brooklyn Commission, and there was a little feeling, I think, when this Association met here at this time; that is, as Dr. Van Derslice said to-night, that feeling was carried over. Now, in the deliberations of the Council this morning, when this matter of recommendations was proposed, the point was discussed on what basis nominations should be made for the Council. One point suggested was that it would be particularly well, particularly advisable to give these particular Commissions representation on the Council. The other view from which the nominations to be made were discussed was the point of usefulness to the propaganda. Now, it turned out in the vote in the Council that, as it happened, no man was elected to represent either the Chicago or the Brooklyn Commissions. Not from any feeling that these Commissions were opposed to the work of this Association whatever, but it was felt that the best interests of the Association would be served by putting in a man from a new place. I am speaking with reference to Dr. Smith's nomination. Dr. Smith was nominated because he came from a section that had never had representation, and where they were doing good work, Dr. Smith being personally a most active and energetic young man who, we felt, would take an interest in the work of the Council. There was no question of excluding the Chicago Commission from representation. I did not know at that time, what Dr. Van Derslice has since said, that they had never been represented on the Council. We discussed the nomination of Dr. Ludlum, and it was stated that New York City had been repeatedly represented on the Council. I don't know whether anything was said about this particular Commission being represented, or not. I want to make clear that Dr. Smith was not nominated in opposition to members representing the other two Commissions, and that this nomination

was not made because the others were not wanted in the Council; but it was felt that it extended the interest in the work up into New England, where such interest had never been taken before. It was at my suggestion that Dr. Smith's name was recommended to you. Dr. Smith is a very dear friend of mine, a most charming fellow, a man who has no superior in his particular line of work, and a young man who is destined to make good in whatever he takes hold of. If it seems wise at this time, I am willing to withdraw Dr. Smith's name in favor of any representation that the Chicago and the Brooklyn gentlemen between them wish on the Council. It was not a choice between men, but a choice between two points of view."

Dr. Ludlum: "The difference of opinions which I think should be presented in the Council meetings is concerning the fact that this Association is constructive and that its function is instruction. If we should make our methods and standards the highest which the highest Commission can live up to. A Commission cannot come into being, like Minerva from the head of Jupiter, and live up to these rules and regulations. If this Association is to be limited to this, the highest grade only, its educational work will be very restricted."

The President: "Any other remarks on these nominations? If not, the tellers will collect the votes. This is the second election on the names of Dr. Smith and Dr. Ludlum for the five-year term on the Council."

A Teller: "The result of the second ballot is that Dr. Smith has seven votes, and Dr. Ludlum nine."

The President: "Dr. Ludlum has been elected for the five-year term of the Council. We will now proceed—"

Dr. Ludlum: "May I have another personal privilege? I don't think I am a fighting man, but when it comes to a question of right and wrong, this appeals to me, and I cannot sit still. I have to vote for the right. I appreciate this election."

The President: "We will now proceed with the election for the two-year term—Dr. Hand and Dr. Robert Black."

The Teller: "Dr. Black received nine votes; Dr. Hand, six."

The President: "Dr. Black is elected."

Dr. Van Derslice: "I move that we take up the recommendations of Mr. Miller."

Dr. Coit: "There are two in the room who have to read papers in the Children's Section."

Moved and carried that we adjourn until to-morrow morning, at 9 o'clock.

Adjourned.

JOINT SESSION WITH SECTION ON DISEASES OF CHILDREN.

Lecture Room, Physics Building, Old Campus, Friday A. M., June 20, 1913.

President Chapin: "The Section on Diseases of Children takes great pleasure in having this combined meeting with the Association of Milk Commissions. We appreciate what they are doing, and we are glad to help it along in any way we can. I will ask Dr. Edwards, the President of the Association, to take the chair."

Dr. Edwards (in the chair): "Thank you. The first paper on the program this morning is Dr. Ravenel's, 'The Transmission of Bovine Tuberculosis to Human Beings.' In Dr. Ravenel's absence, the Secretary will read us the paper:"

THE RELATION OF BOVINE AND HUMAN TUBERCULOSIS.

Mazÿck P. Ravenel, M.D., University of Wisconsin, Madison, Wisconsin.

During the past year discussions as to the importance of bovine tuberculosis in relation to human health have continued.

At the International Congress on Hygiene and Demography, held in Washington in September, 1912, the subject was considered, and among the speakers were Professor Weber, of the Royal Health Office in Berlin, who did much of the work for the German Imperial Commission; Dr. Park, and the writer of this paper. The following points seemed to be conceded by all:

First: That bovine tuberculosis is a real menace to human health, causing a not inconsiderable number of deaths, and a larger number of temporary and permanent deformities. Dr. Park has summarized the results of the work of himself and Krumweide, as well as the work of other authors throughout the world, with the following results:

"Of 63 children dying of tuberculosis at the Babies' Hospital, 59 cases proved to be human infection and 4 bovine, a percentage of 6 1/3.

"Of 9 children dying of tuberculosis at the Foundling Hospital, 4 proved to have derived their infection from human sources and 5 from bovine, a percentage of 55.

"Of a total of 88 children under five years of age who died of tuberculosis, 77 proved to have derived their infection from human sources and 11 from bovine, a percentage of 12½.

"Combining the cases studied in New York with those of other observers in different parts of this country and Europe, the following results are obtained:

"Adults, 787 cases—777 human and 10 bovine infection.
"Children, five to sixteen years, 153 cases—117 human and 36 bovine infection.
"Children under five years, 280 cases—215 human and 65 bovine infection."

The figures of the Foundling Hospital show the real danger of unprotected cow's milk.

The problem has been approached during the past year from a new standpoint, which is found in a paper by John Frazier, in the Journal of Experimental Medicine, October 1, 1912. The reason why this work was undertaken forms an interesting history. Mr. Stiles, the noted orthopedic surgeon of Edinborough, who has steadfastly maintained the danger of bovine tuberculosis to human beings, was summoned to see a baby. He found the child suffering from tuberculosis of the joints, and practically in a dying condtion—so much so that he declined to operate. The death of the child occurred shortly afterwards. Mr. Stiles gave the opinion that the child had been infected by drinking milk from tuberculous cattle. The father considered this impossible since he had his own cow, and it had been tested with tuberculin, giving a negative reaction. Dr. Stiles insisted, saying that the negative reaction was probably due to the fact that the cow was too advanced in the disease to give a reaction. The animal was slaughtered, and found to be a far advanced case. The father was so impressed with the showing, and with the importance to the health of children, that he agreed to give money for a study of the question. The paper of Dr. Fraser is the result.

Seventy cases of surgical tuberculosis were examined. Forty-one of these showed the bovine bacillus, and twenty-six the human. Three showed both bovine and human. Sixty-seven of these cases were in children twelve years and under, and three cases were in adults—twenty-four, twenty-five, and thirty years, respectively. Taking the children from the zero to the five-year period for comparison with the results given by Park and Krumweide, we find forty-seven cases—thirty-two infected with the bovine germ, twelve with the human, and three with both. When we come to study the family history of these cases, we find some impressive facts. In twenty-one cases there was a family history of tuberculosis. Among these, fifteen gave human cultures and six bovine—71% human. In fifty-two cases no tuberculous history could be elicited—among these only nine human cases and

forty-three bovine—83% bovine. The picture is entirely reversed.

THE AGE INCIDENCE IS VERY STRIKING.

0 to 1	year	4	cases	4	Bovine	0	human	
1 to 2	"	12	"	8	"	2	"	2 both
2 to 3	"	15	"	11	"	3	"	1 "
3 to 4	"	10	"	6	"	4	"	
4 to 5	"	6	"	3	"	3	"	
5 to 6	"	3	"	0	"	3	"	
6 to 7	"	5	"	3	"	2	"	
7 to 8	"	6	"	4	"	2	"	
8 to 9	"	1	"	0	"	1	"	
9 to 10	"	1	"	0	"	1	"	
10 to 11	"	3	"	1	"	2	"	
11 to 12	"	1	"	1	"	0	"	
Adults		3	"	0	"	3	"	

The original tables show twenty-five human, forty-two bovine, and three both, not agreeing with the summary.

It will be noticed that in the age period four to five years, there is a marked decrease, which is maintained throughout. It is to be hoped that further studies of surgical tuberculosis in children will be pursued along similar lines.

The conclusion from this study is inevitable—namely, that in children, in addition to the large number of deaths which occur from bovine infection, there are many cases of infection resulting in deformities more or less severe in character and more or less permanent.

The President: "You have heard this interesting paper of Dr. Ravenel's. It is open for discussion. If no one wishes to say anything, we will proceed, and Dr. McCleave will present his paper on 'Certified Milk.'"

CERTIFIED MILK.

Thomas C. McCleave, M.D., Berkeley, California.

The propaganda for clean milk has been one of the chief factors in the development of the "Social Welfare" movement during late years. In all our centers of population Certified Milk is an important item in the food supply of the baby, and its production engages the attention of many of our best sanitarians and pediatrists.

We find that there is still prevalent in the profession, even where we would least expect it, much misconception as to what Certified Milk is, and what benefit is to be expected from its use. Thus we often hear Certified Milk spoken of as if it were identical with Pasteurized Milk, and I have known physicians to advise against the former on the ground that to heat milk made it unfit for infant-feeding, although Certified Milk is, of course, not heated at all. In the Journal of the American Medical Association we find the question asked, "Is Certified Milk Safe?"[1] and the emphasis is there laid on the dangers which are inherent in all milks and against which even Certified Milk cannot absolutely guard. In the American Journal of Diseases of Children we find quoted[2] without unfavorable criticism a standard of 30,000 bacteria per cubic centimeter; while in a paper[3] read before this Section last year it is asserted that a "waste of money and effort accompanied the work of many of the charities which confined their efforts to the distribution of clean milk, of which so much was once expected, but which accomplished little more than to help to prove that impure milk plays by no means the most important part in the causation of infant mortality." What the writer of the article doubtless had in mind was the now generally recognized truth that impure milk is but one of the many factors in our tremendous infant morbidity and mortality, and that measures for the prevention of summer diarrhea and similar diseases, which are predicated only on the furnishing of clean milk for children's use, have not been so successful as at first was anticipated; but that these efforts were barren of results, as affirmed by the writer of the criticism, is absurd. All agencies intended to improve the living conditions of the children of our poor take their origin from the pure milk movement, and have, as one of their most important functions, the proper feeding of the babies under their control. This means, as a primal necessity, that the milk furnished them shall be clean.

Because of lack of information on this subject among the

[1] Is Certified Milk Safe? Editorial, THE JOURNAL, A. M. A., April 20, 1912, p. 1200.

[2] Mosher, C. G.: Metabolism and Nutrition, Diet. and Hyg. Gaz., March, 1912; abstr., Am. Jour. Dis. Child., October, 1912, p. 256.

[3] Cooley, Thomas B.: Relation of the Infant-Welfare Movement to Pediatrics, THE JOURNAL A. M. A., Dec. 2, 1912.

profession at large, and because of the recent adoption by the American Association of Milk Commissions of a code of requirements which it is hoped will eliminate discrepancies in the requirements of different Commissions and which will make the production of Certified Milk uniform throughout the country, it has seemed to the officers of the Association that this was an opportune time to bring to notice the provisions of this code and to make more accurate the general conception as to what Certified Milk is.

The Certified Milk movement originated with Dr. Henry L. Coit,[4] who, after several years' ineffectual effort to improve the milk supply of his community through legislation and other ordinary means, devised the plan for a Commission consisting of medical men, who, by voluntary supervision and control of methods, by paid expert inspection of dairy work, and by their certification of the product, should undertake, in co-operation with dairymen possessing the requisite intelligence and capital, to make available a supply of milk produced under regulations imposed by themselves, which should fulfill the most exacting requirements of the physician.

Under the leadership of Dr. Coit, the first Medical Milk Commission was organized in 1893, in Essex County, New Jersey. The term "Certified Milk" was coined to designate the milk produced under the control of this Commission, and was protected by United States copyright. In addition to this, many States have since passed statutes prohibiting the use of the term except on the authority of a properly constituted Commission. The movement, originally designed by its author to meet the dire necessities of his own neighborhood, was so successful that similar Commissions were organized elsewhere—in New York, in 1896; in Philadelphia, in 1897, and since then throughout the country—until there is now a total of not less than sixty Commissions in twenty-three States, and two in Canada. New York leads with ten, Ohio has six, while California, in the extreme West, and Massachusetts, in the East, each have five. The American Association of Milk Commissions was organized in

[4] Dr. Coit's writings are freely quoted without definite reference.

1907, to institute better methods of propaganda and to unify the work of its component Commissions. In California there is also a State Association, which aims to keep the work within its jurisdiction on the same high plane.

The influence of these Commissions has been so profound, not only within the limits of their own immediate activities, but in relation to the improvement of the general milk-supply and all other food products, that they may be classed as one of our most important agencies in public health work; and Dr. Coit, through whose continued ardent advocacy of the cause of pure milk thousands of babies have been saved from needless sickness and death, may properly be named among our great medical philanthropists.

The first step in the acquisition of a supply of Certified Milk in any community is the organization of a Milk Commission. This should consist of about five physicians, selected by the county medical society solely because of their known interest in all that the pure milk movement stands for, and perhaps a public-spirited attorney or one or two other lay members should be added to it. Their term of office should be five years, for experience in the work is essential for useful service on a Commission, and the personnel should be changed as little as possible. The members receive no pay, and the expense of the work, the fees of the experts, printing, etc., are provided for by a system of assessments on the dairies certified.

An approved and trustworthy dairyman, with financial ability and adequate dairy facilities, must then be found who will agree, in consideration of medical support and an increased recompense in the price of his product, to conduct his dairy, collect and handle the milk in conformity with the requirements of the Commission.

Formerly each Commission fixed its own requirements, and naturally there resulted a great variety of standards. The code of the American Association was adopted last year only after the most painstaking consideration of its provisions by a committee of able and experienced members, and it may be held to represent the most authoritative conception of the conditions under which milk should be produced for certification. Membership in

the Association will hereafter depend on acceptance of and compliance with this code, and it is hoped that the heretofore heterogeneous standards of the various Commissions will soon be obsolete.

The duties of the members of the Commission shall be to enforce the regulations, which, in the code referred to, cover in minute detail every phase in the production of Certified Milk; to be responsible for personal inspection of the dairy and distributing stations at such intervals as will serve to keep them thoroughly in touch with the management; to provide for competent expert examination of the herd by approved veterinarians, and bacteriologic and chemical analyses of the milk at proper intervals; to maintain such supervision over all matters pertaining to the health of employees as will protect the milk against contamination by pathogenic organisms from those engaged in handling it; and to advance the doctrine of pure milk by private precept, by public lectures, exhibits, literature, and all other available means.

The control of the Commission over the dairy and the entire process of production and distribution of the milk must be absolute. The hygiene of the dairy is the first consideration. The terrain of the farm must be such that it is well drained, and the paddocks and yards shall be kept clean and dry. Rubbish and stable dirt shall not be allowed to accumulate, nor shall any insanitary condition be permitted. The water-supply must be pure and ample.

The dairy buildings must be located at a sufficient distance from other buildings, toilets or latrines, dusty roads, cultivated and dusty fields, or other possible sources of contamination. If unavoidably exposed to dust, the buildings must be screened with cheese cloth.

The stables must be so constructed as to facilitate the prompt and easy removal of waste products. The floors must be made of non-absorbent material, must be properly graded and drained, and have cement gutters at least six inches deep to catch and carry off all manure and drainage. The walls and ceilings should be planned to avoid lodgment of dust and dirt. At least six

hundred cubic feet of air-space should be allowed for each cow, with not less than four square feet of window area. The buildings must be screened to prevent the entrance of flies, rats, and other vermin. The greatest cleanliness must be maintained about the premises at all times; the stables are to be washed out twice daily, and all feed and water-troughs kept clean and sanitary.

The proper selection of cows for a certified herd is a matter of importance, a proper admixture of animals of different breeds being frequently necessary to maintain the requisite fat standard. The productivity of each cow in a herd should be recorded and the unprofitable ones weeded out, as a few such in a herd lower its average output very appreciably and entail financial loss to the owner. No cow should be admitted to a certified herd until its freedom from tuberculosis or other disease has been determined by the veterinary expert of the Commission, and the entire herd must be subjected semi-annually to a rigid tuberculin test, which shall conform to the rules and regulations of the United States Government with respect to tuberculin testing.[5] Veterinary supervision must be maintained at all times, and sick cows at once removed from the herd and quarantined or destroyed, as the nature of the illness may require. In California there is what should be regarded as a valuable rule in relation to the exclusion of tuberculosis from the herds, namely, when a group of animals from one source is examined for admission to the herd, if more than ten per cent react to tuberculin, the entire group is rejected. We do not believe it safe to admit to a certified dairy even non-reactors from herds known to be extensively infected, as this will almost surely permit animals in the incipient stage of the disease to gain entrance. Each animal is identified by a numbered ear-tag or other mark, and a descriptive record is kept of distinctive markings, dates, results of tuberculin tests, etc.

Cows should be kept clipped, and before each milking must be thoroughly cleansed by brushing and washing, the udders especially being washed clean and dried. All utensils used in handling the milk must be sterilized, and the milkers must wear

[5] Circular of instructions for making tuberculin tests, U. S. Bureau of Animal Industry.

clean, washable suits and carefully cleanse their hands before milking. One of our Western dairies, under probationary certification during the past year, has been using milking machines, with which great difficulty was at first encountered in keeping down the bacterial counts, but this is apparently being obviated by experience and minute attention to detail.[6]

The milk must be strained, cooled, and bottled immediately after being drawn, and the bottles sealed with a cap bearing the name of the dairy and of the certifying Commission, together with the date of production or of permissible delivery. The bottles must then be packed in ice in suitable containers for shipment, and must reach the consumer within thirty hours, the temperature at the time of delivery not to exceed 50° F.

Chemical and bacteriologic examinations of the milk are to be made at least weekly, and in the event of any deviation from normal standards, tests shall be made daily until the discrepancy has been corrected. If this cannot be accomplished within ten days, certification shall be withdrawn. So delicately balanced may be the organization of a certified dairy, and its success so dependent on perfection of technic, that I have known the sudden loss of a cleaner to be at once discovered by the bacteriologist, the added work thrown on the remaining hands, and the slight relaxation in methods having resulted in an immediate rise in bacterial content.

The methods that must be followed in carrying out the chemical investigations essential to the protection of Certified Milk are so complicated that, in order to keep the fees of the chemist within moderate limits, those procedures must be eliminated which are not strictly necessary to demonstrate the quality of the milk. For this reason the determination of the water, the total solids, and the milk-sugar is not required as a part of the routine examination by the code of the American Association.

The fat standard is fixed at 4 per cent, with a permissible range of variation of from 3.5 to 4.5 per cent, while the standard for Certified Cream is 18 per cent, with an allowed variation of

[6] Since writing this paper, certification of this dairy has been canceled.

2 per cent in either direction. The tests recommended are the Babcock, the Leffmann-Beam, and the Gerber.

The protein standard is fixed at 3.5 per cent, with a permissible range of from 3 to 4 per cent, to be determined by the Kjeldahl method, the Gunning or other reliable modification being used, and the factor 6.25 being employed in reckoning the protein from the nitrogen. The protein determination may be omitted, except when some special condition renders it desirable.

The chemical examination also includes tests for adding coloring matter and preservatives, among the latter being formaldehyde, borax, boric, salicylic and benzoic acids, and salts of the latter; and tests to determine if the milk has been heated. The specific gravity should be between 1.029 and 1.034.

The bacteriologic standard of the American Association is not to exceed 10,000 bacteria per cubic centimeter of milk, and the presence of pathogenic bacteria excludes the milk from certification. The samples to be examined must be collected by a representative of the Commission, in original packages as offered for sale, and they must be kept iced until plated, which shall be not later than forty hours from time of milking. Because of the great variation in methods for the bacteriologic examination of milk and the divergent results thereof, the methods to be followed in the examination of Certified Milk, the composition of the culture mediums, the technic of plating, and the period of incubation are all carefully specified, thus affording a proper basis of comparison between milks from different sources. The experts of the Commission are required to render written reports of each examination made by them, these to be kept on file in the office of the Secretary.

The milk laboratory is a development of the pure milk industry, which now, in a number of our cities and in connection with certified dairies, affords the physician an opportunity to order for his little patients milk formulas much more accurately compounded than is possible by home modification, which is a very great advantage in infant-feeding.

The conditions under which Certified Milk is produced make

it impossible that it shall ever constitute a large part of the total milk supply. As long as we continue to use milk in its natural state, however, we may feel sure that no higher grade of milk can be obtained and that certification will continue to exert an ever-increasing good influence. The one disadvantage urged against it is that of its higher cost in comparison with ordinary milk. This is apparently a valid objection, but it may be stated that in no other combination of foods obtainable in the markets can the same food value be obtained for the price which Certified Milk commands. The objection, therefore, is more apparent than real.

Chief among its advantages are its known and constant chemical composition and nutritive value; its relative freedom from bacteria of any sort, and its practically absolute freedom from pathogenic organisms; its early delivery to the consumer in sealed and iced containers; its purity and freedom from adulteration, and its consequent adaptability to the dietetic requirements of children and invalids.

That these qualities are assured by the guarantee of physicians actuated solely by philanthropic motives in their Milk Commission activities, merits for Certified Milk the confidence of the profession and the public. We feel, therefore, that we may expect the unqualified support, especially of pediatrists, and of all those who are interested in the public health.

The President: "Dr. McCleave's paper is open for discussion."

Dr. Van Derslice: "Dr. McCleave certainly has a happy faculty of expressing his views. One point that I want to call to your attention is the milking machines. We have them, and we do not have any of the trouble that Dr. McCleave speaks of. But we did find that the veterinary's attention was very important. We found it was necessary to examine that herd weekly, and practically every time that we went to the herd it was necessary to throw out one or more animals on account of mastitis. So the milking machines were discarded. One of the other farms is using the milking machine,

and they believe that improvements have been made in that milking machine so that it will not develop this mastitis."

Dr. Coit: "It is proper that I should refer to this mention of my name in connection with the subject, and I wish to say that without the co-operation of the producer, my work in the beginning would have been of no effect. If it had not been for the loyal co-operation of physicians and others associated with me in the organization of the first Commission, my humble plan would have been nil. I should like to name the first producer, Mr. Francisco, who made the first quart of Certified Milk. I think his name ought to go down in the history of this crusade. Dr. Geier mentioned the reputation which his Commission had for efficiency. In this connection should be mentioned the name of Mr. Miller, who is the manager of the French Brothers' farm. If it had not been for the loyal support of the representatives of the various Commissions and such men as Rowland G. Freeman, Samuel McC. Hamill, Otto P. Geier, Dr. Myers (of Milwaukee), and Dr. Tuley (of Louisville), the work of this Association could never have gone forward. These men were the pioneers in giving character to this movement, which is now represented by a federation of sixty-three Commissions. I simply wanted to supplement that kindly reference to me by Dr. McCleave, by mentioning the names of a few others, without whom this movement would never have amounted to anything."

Dr. John Zahorsky, Saint Louis, Missouri: "I just want to say a word about the bacterial count. In Saint Louis we have had a great deal of difficulty in keeping the count below 10,000. We still think we should have some variation in the standard. As far as the effect on the infant is concerned, it does not matter whether it is 10,000 or 1,000. Of course, we want to keep the bacterial content as low as possible, but still I think we have to make some of the standards not fixed, but to admit of some certain variations, depending on local climatic conditions. That is, there will have to be a minimum and a maximum percentage and not a definite, fixed line."

Dr. McCleave: "The fat content of the Holstein runs rather lower than that of other breeds of cattle; but as Certified Milk is designed mostly for use in infant feeding, that low fat content of the Holstein is an advantage rather than a disadvantage. The value of the milking machine is problematical. The great difficulty has been found in methods of sterilization of the tubes, etc., to go with the machines, and with the fact that they do produce mastitis. The object of the Milk Commission movement, as I understand it, is to assure the public and physicians that, whether in New York, Chicago, or San Francisco, when they get Certified Milk they will know what they are getting. It is true that in this country there are Commissions certifying milk where the cows have not been tuberculin-tested. That is not Certified Milk. The men who give their guaranty to milk of that character are prostituting the whole movement. The object of this Association is to guarantee as nearly as possible that the various Commissions which compose the Association will, so far as possible, come up to these standards."

The President: "This is a good time to hear from some of these milk producers. Mr. Francisco is here, and Mr. Miller, pioneers in this work, and they come prepared to speak on a very interesting subject—the cost of Certified Milk. I will ask Mr. Francisco to speak to us."

THE COST OF CERTIFIED MILK AT FAIRFIELD, NEW JERSEY.

Stephen Francisco, Fairfield, New Jersey.

MR. PRESIDENT, LADIES, AND GENTLEMEN:

Our plant is run entirely for producing Certified Milk. We have a herd of about six hundred cattle, and are using five hundred in the certified herd. The entire herd is under the control of the Commission; that is, the veterinarian is responsible for the health of the herd. He must have, or you cannot get results.

Our cattle feed costs us about $240 per day. The average milk production per cow is 11¼ quarts per day. The cost of

labor—that is, milking—is $36 per day; the care of the cows is $40.80; the handling of the milk is $16.66; superintendence, $23.63. We consider the superintendence to be the most vital point in the production.

Certified Milk costs (including depreciation charges to stock and plant) between twelve and thirteen cents per quart when delivered.

THE COST OF THE PRODUCTION OF CERTIFIED MILK.

Wallace E. Miller, Lebanon, Ohio.

There is no uniform system of accounting among producers of Certified Milk. Each company or individual has local conditions which are perhaps peculiar to the section where the milk is produced. Each business is a matter of growth, and has originated in a different manner. Again, the aims among business men engaged in this industry are various. Some have looked upon the production of Certified Milk as a means of livelihood, some regard it as a by-product, and others are engaged in it for reasons connected with personal vanity. It is easy, therefore, to see how wide apart these men and companies of men must be upon any given subject. Their systems of accounting are no exception.

It would seem desirable to some to arrive at a basis of comparison, if we can overcome the natural reluctance of a business man to disclose the secrets of his business.

In order to stimulate the production and use of this very desirable clinical milk, more communities and more men must become enlisted in this movement. On its business side it is worth while only to get men whose motive is that which actuates all other business. Such a man will hesitate until the demonstration is complete that he will make money, or at least not lose what he already has earned. It is generally reported and believed that the chances of losing are greater than of gaining. We are, therefore, at a standstill until this impression can be overcome—a result which cannot be attained in a day.

Our prime essential is to exclude from all calculations the concerns that are on a dual basis of philanthropy and business. Everyone knows that the two do not mix well as the mainsprings of a money-making effort. Either it must be one thing or the other. Profits in a substantial form are necessary. Somebody must profit or there will be no Certified Milk, and that person must be the one who risks his financial resources. This must be clear or men will not come forward to do this work, without which the interested physician can accomplish nothing, for of what is the use of certification if there be nothing to certify to? How long will there be anything to certify to if there is no financial profit?

In the following table I have reduced our costs to percentages, which render the problem easier to grasp than would the actual figures, and I think all the purposes connected with information are served. These percentages are our results for a period of one year, and would probably hold true with us for any year.

PRODUCING.

Cost of Certified Milk.

Wages	28.26%
Supplies	2.40%
Stable—hauling	.31%
Power and refrigeration	.58%
Repairs	1.31%
Freight	5.46%
Feed	47.23%
Cost of certification	8.42%
Miscellaneous	4.79%
Bedding	1.24%

The question is very pertinent as to whether the price of Certified Milk is sufficient. I have heard of Certified Milk selling for twelve cents a quart. I have heard of it selling for twenty cents a quart. If the milk is the same all over the United States, as it should be, then why this difference of cost? That is a question which I cannot answer, but it does seem desirable, in the first place, that the business organization of every dairy should be an efficient one, and my own attitude toward this matter is that the business man should do all he can to bring about the highest degree of efficiency in his organization. He

must reduce the cost as much as possible before he begins to talk about wanting more money for the product. Some men say they cannot afford to sell Certified Milk for twelve cents or sixteen cents. Perhaps they can't. Perhaps it is their own fault. Maybe there is something in their organization that needs improvement. We should first be sure we have approximated one hundred per cent efficiency; then if the price of Certified Milk is not sufficient to give us a fair compensation, it is time to ask for an increase in price. I think all fair-minded producers are trying to reduce the cost as much as possible. There was a time when one man could take care of a section of a herd—ten cows. He was expected to do everything—he had to clean, feed and water, and milk them. We thought we could get a greater efficiency by organizing our force into three divisions—a cleaning division, a feeding division and a milking division. That is the system that we employ now.

Just 8.42 per cent of the cost of Certified Milk with us goes to the cost of certification—which, I should explain, includes the cap as well as the inspection. It seems to me, that is where the physician comes in. I think you should try not to burden the consumer with the unnecessary cost of supervision and capping. At present we have to have a hermetic seal, something that cannot be tampered with by the crook. The man who handles the milk from the time it leaves the dairy until it is placed in the hands of the consumer is not trusted by the Commission. We should try to get trustworthy men, so we will not have to keep it under lock and key. Of course I recognize the necessity for that now, but perhaps we can reduce that necessity and decrease the cost. I feel that this is an important question, the cost of certification. Of course we must protect the public as much as possible. After the public is protected, our supervision should stop.

Another thing that increases the cost of Certified Milk is the appearance. We have to take into account the psychology of the situation. Things have to look clean as well as be clean. Can anybody tell me in what respect a white suit is any cleaner than a blue suit or a black suit? It simply looks cleaner. If

we are to spread this gospel of Certified Milk among the consumers, among physicians, we have to appeal to the eye. The bacteria count may be good, but the people cannot see the germs; they can see the color of the suit, which may have nothing whatever to do with the bacteria count. That is one thing that keeps up the cost. We have to put on a certain appearance before people, and while we do not have inspection days, we must be always ready for inspection. That costs money. The thing that appeals to me, and I thing it appeals to every physician, is to bring Certified Milk within the reach of the greatest possible number, and while you have not a cent in the business, I ask for your cooperation in reducing the cost, so that people even in the poorest circumstances may have this product, which means good health and long life to their babies.

These costs do not include distribution. They are costs laid down in Cincinnati, freight paid, but the milk has not yet been distributed to the consumer. This Certified Milk is distributed along with the other milk. Therefore, it is impossible for us to distinguish the cost of distributing certified from other products. If we had nothing but Certified Milk, it would be easier.

The costs of keeping up the herd is based on the assumption that the herd is practically stationary. Individuals go out, but others come in. We have practically no loss from the tuberculin test. As a matter of fact, the herd increased in value during the time under discussion.

As to repairs, our aim is to keep the equipment in the original condition. It is practically as valuable, because of improvements from time to time, as in the beginning.

The President: "We have heard these very interesting addresses by Mr. Francisco and Mr. Miller, and this subject is now open for discussion."

Dr. Ludlum: "I would like to ask Mr. Miller one question. His figures, his sum total of the cost of producing a quart of Certified Milk, and Mr. Francisco's vary quite a little, and my impression is that Mr. Francisco includes the cost of distribution and Mr. Miller does not. It does not seem to me

that there is sufficient allowance in that for distribution. Mr. Francisco's cost was twelve to thirteen cents, and Mr. Miller's, nine and a half; and the difference is presumably distribution. That is a point of considerable importance to consider in making comparisons between the two. There are a couple of other points in which I differ from Mr. Miller. The lock-and-key proposition: that is looking forward to a millennium —a hundred years from now, perhaps. The milk must be under lock and key as well as possible until human nature is different from what it is now. It is the only assurance that we have that it is not tampered with. It goes through several hands, and it must be under lock and key. As to appearance: if he used blue suits on the farm instead of white, they would not see the dirt, and the suits would be allowed to secure and retain the dirt and germs before they were discarded. It is a matter of appearance from a sanitary standpoint, and not merely for appearances' sake."

Mr. Miller: "This cost, as the gentleman surmised, does not include distribution. The cost of the cap is something like nine per cent; that includes the capping and the inspection by the veterinarian and the inspection by the bacteriologist and chemists—all charges of that nature, and the tuberculin test. That is figured at 4¾ cents per pint."

A Member: "How much does it cost, outside of certification; how much more does this milk cost than good milk—just the wages, outside of the certification?"

Mr. Miller: "Yes, wages and repairs and freight are all higher than they would be on the common milk. The supplies come higher also. The wages and food are higher than they would be under ordinary conditions."

Dr. McCleave: "It does not seem to me, Mr. Miller answered the gentleman's question. The large cost of Certified Milk as compared with ordinary market milk is found in the addition to the actual expense of certification, inspection, cost of caps, which are the actual costs of certification; it depends

also upon very greatly increased running expenses in the dairy, steam sterilization plants, etc."

The Secretary: "There is nothing probably that is so misunderstood as the cost of certification. I tried some years ago to make a survey and tabulation of the methods used by various Commissions in the country, in order to compare different methods of handling the broad problem of certification and its cost. I may be excused for speaking on that subject for, to my mind, there are just as many methods of arriving at the cost of certification as there are Milk Commissions in the country. One Commission charges a per bottle tax and supplies nothing; in addition to that, they furnish the bacteriological work, as well as medical inspection. The next one charges a flat rate for bacteriological, chemical, and veterinary examination, and the producers buy the caps. In another instance, the producer buys caps and pays directly to the experts, and the Commission does nothing in that way, and so on. In Cincinnati the percentage is about eight per cent. This includes the caps. The bacteriological examinations are done semi-weekly, and more frequently if there is any difficulty. The Commission is able, with that cost, to maintain a laboratory for this work in connection with the office of the Commission. The bacteriologist and chemist are at the call of the community in the work, and the Commission also does circular work and advertising."

Mr. Miller: "The cost of keeping up the herd is based on the assumption that the herd is apparently stationary. We have made no change in the herd. We have practically no loss in tubercular reactions, and, as a matter of fact, the herd increased in value during the time that is under discussion; and as far as repairs and keeping up equipment is concerned, our aim is to keep the equipment in its original condition. When anything is out of order it is at once fixed, so that it is as efficient and valuable as ever, because improvements are made from time to time and charged to repairs."

THE EFFICIENCY OF THE MEDICAL MILK COMMISSION GRAPHICALLY ILLUSTRATED.

By Henry L. Coit, M.D.

I have been watching the development of my plan to control the production of milk designed especially for clinical purposes for nearly a quarter of a century, and I feel that I have the right at this time to define it and say when Certified Milk is certified, and when it is not. That the term is often used for the falsification of milk is well known, and that the work of the Milk Commissions is not always designed to inspire confidence goes without question.

There is in the world a great deal of activity without efficiency. Let me illustrate in a very homely way: Many of you this summer will drive a fly from your nose; and that fly may be driven from you time and time again; that is activity without efficiency. Someone else will deliberately take a newspaper or a fly-swatter, find that fly, and kill it. That is economy of effort: that is efficiency. I have been searching for many years for a scheme by which the Medical Milk Commission and its plan, its principles, and its high object can be demonstrated by a graphic outline, showing not only accurate geometric proportions, but also illustrating the relative importance of its four lines of activity. I determined, as a basis for my geometric, graphic chart, the following theorem and principles.

Theorem: Of all iso-perimetric rectangles, the square is the maximum.

Basic Principle: Scientific knowledge increases efficiency and conserves effort or labor.

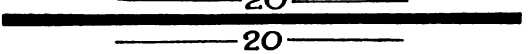
1. Activity, negative and inefficient, is represented by a straight line.

2. The length of the line, while it may represent activity or effort of various kinds, should not be taken for or indicate efficiency.

3. Breadth without depth or effort without knowledge yields no efficiency.

The negative results of activity without efficiency-

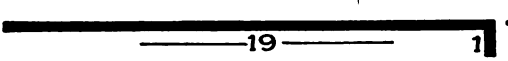
A straight line indicates activity without efficiency



Breadth without depth results in no efficiency
Breadth alone or effort without knowledge yields no efficiency

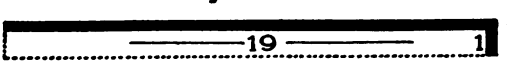
4. The breadth and depth represent effort based upon various kinds of knowledge. Breadth should represent practical knowledge, and depth, scientific knowledge. Breadth multiplied by depth results in area.

Breadth equals effort based on practical knowledge



Depth equals effort based on scientific knowledge

Breadth times depth equals area and indicates efficiency

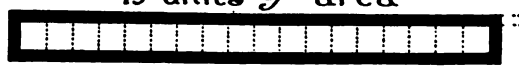


As depth replaces breadth efficiency is increased to the maximum.

5. Units of area represent units of practical efficiency. The perimeter of the rectangles are equal and represent the total of effort both practical and scientific. The first rectangle represents practical dairy hygiene which with little scientific knowledge and domestic cleanliness yields good MARKET MILK.

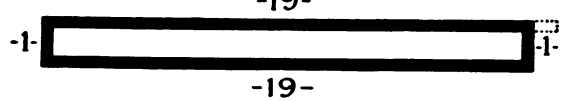
Area equals breadth times depth and represents efficiency

19 units of area

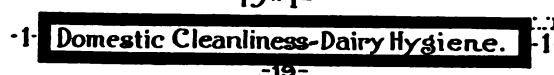


Representing 19 units of practical efficiency

The perimeter equals total effort, practical and scientific

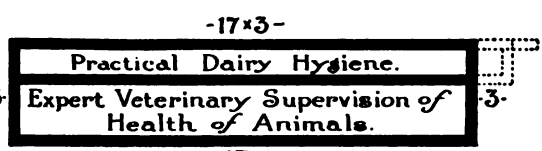


The perimeter of this rectangle equals 40.
and represents the amount of effort expended.



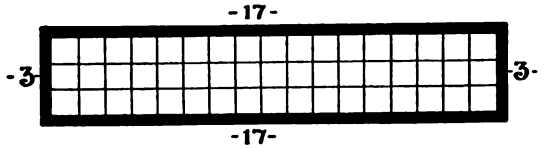
Represents practical Dairy Hygiene and unaided yields
Good Market Milk:

6. The second rectangle represents further replacement of breadth by depth, or the conservation of practical knowledge and effort by scientific knowledge through the employment of expert veterinary supervision of the health of the herd, and yields fifty-one units of practical efficiency, or "INSPECTED FARMS MILK."



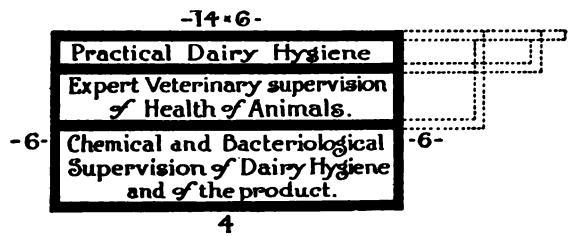
Represents further replacement of breadth by depth
yields more cleanliness and added safety in the milk
"Inspected Farms Milk".

This rectangle has the same perimeter of 40, representing the quality of effort and the application of scientific knowledge



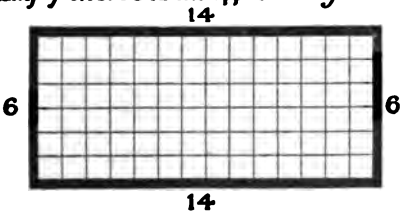
Representing 51 units of practical efficiency.

7. When depth, which represents scientific knowledge, replaces breadth, which represents practical knowledge, the units of area in the rectangles are rapidly increased and show the progressive conservation of practical effort by the application of scientific knowledge, and result in a progressive increase in the number of units of practical efficiency. The third rectangle represents the application of chemical and bacteriological supervision of the dairy hygiene and of the product, and yields eighty-four units of efficiency, or "GRADE A MARKET MILK."



Represents further conservation of initial cleanliness, added quality and safety features and yields milk of the grade known recently as "Grade A" Municipal Milk.

This rectangle has the same perimeter of 40: represents the quality of effort and the application of extended scientific knowledge.

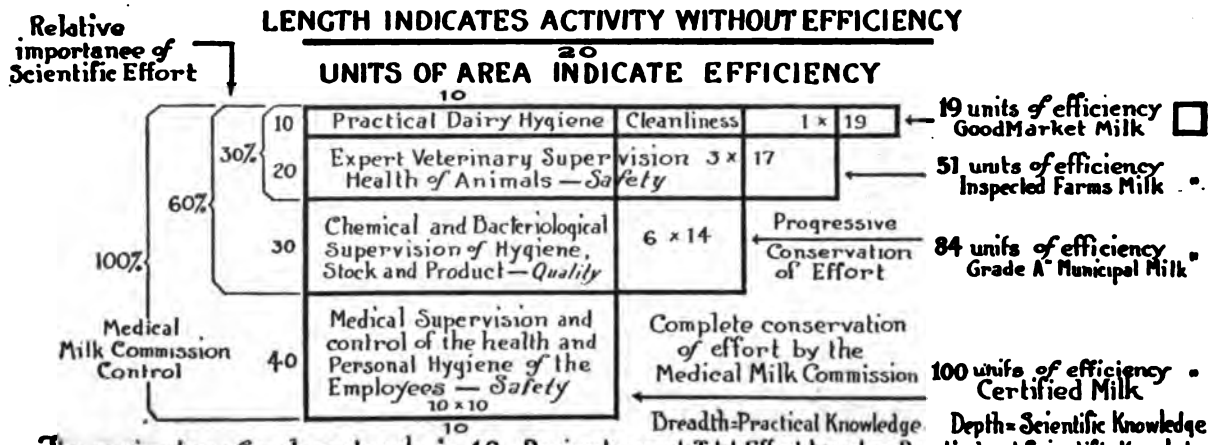


Representing 84 Units of practical efficiency.

THEOREM: OF ALL ISO-PERIMETRIC RECTANGLES, THE SQUARE IS THE MAXIMUM.

SCIENTIFIC KNOWLEDGE INCREASES EFFICIENCY AND CONSERVES LABOR.

THE EFFICIENCY OF THE MEDICAL MILK COMMISSION



The perimeter of each rectangle is 40. Perimeter equals Total Effort based on Practical and Scientific Knowledge
Area equals Dreadth times Depth and represents Practical Efficiency.

8. The square or the fourth rectangle shows the complete conservation of practical effort by the application of scientific knowledge through the medical supervision of the health and hygiene of the employees engaged in the collection, handling, and distribution of the milk. This replacement of breadth by depth results in the maximum of practical efficiency, yields one hundred units, and illustrates the relative importance of the four lines of control by the work of the Medical Milk Commission.

9. The completed graphic outline may be used to represent the principal grades of milk now recognized by Boards of Health and other authorities, and while the first three of them consist of grades which are produced without the supervision of a Medical Milk Commission, and while the perimeter of the rectangle representing each corresponds with the perimeter of the maximum rectangle, yet without the influence of medical supervision of methods—whether they be hygienic, veterinary, chemical, bacteriological or prophylactic—each of them lacks the quality of depth and the maximum of scientific knowledge necessary for the production of Certified Milk.

I shall not be satisfied until the Certified Milk movement realizes what it was designed to accomplish, namely: The attainment of the highest theoretical standards for milk as respects purity, quality, and safety.

Dr. Coit: "I have been called names by Dr. Geier. In one connection he called me an 'apostle,' and I reply by calling him an 'epistle.' After speaking to you about co-operation in the initial steps of this movement, it occurred to me that I had omitted one of the most important names, that of the Chairman of this Section, Dr. Chapin. Dr. Chapin was the man who organized the second Medical Milk Commission, in the county of New York, and it was through the earnest and laborious efforts of Dr. Chapin to overcome obstacles, objections, and prejudices that he finally won out after three years of work by the original Commission."

The President: "This brings our program to a close. Before closing, I would like to ask that the American Association of Milk Commissions thank the Section on Diseases of Children for their courtesy in extending to us this invitation to hold this joint session. I would also like to make the announcement that there will be a session of the American Association of Medical Milk Commissions this afternoon at the Hotel Radisson, at 2 o'clock."

The President: "The Secretary has just handed me the paper of Professor Harding, on the 'Effect of Barn Operations Upon the Germ Content of Milk,' which should have been read at this time, but we did not know that Dr. Harding was with us. With your permission, we will hear this paper before taking up this other matter."

THE EFFECT OF BARN OPERATIONS UPON THE GERM CONTENT OF MILK.

H. A. Harding, Ph.D., Professor of Dairy Bacteriology, University of Illinois.

When the fathers of Certified Milk wished to define the milk which they desired they found themselves unable to do so in terms of milk quality because science had not provided the necessary data. Lacking direct and natural means of expressing their ideals regarding milk, they resorted mainly to a description of the conditions under which milk must be produced. In doing this they tacitly acknowledged that milk is like the human being in that its quality depends upon two factors—its heredity and its environment. Heredity fixes the proportion of fat and total solids, while environment furnishes the other influences which determine whether the milk shall be a desirable or an undesirable article of food.

In attempting to describe milk in terms of dairy operations, the available scientific data was very scanty and reliance was placed upon estimates of the probable influence of various factors. The general procedure was in accord with the usually accepted dictum in sanitation: if any factor is suspected of exerting an

unfavorable influence, that factor should be removed as completely as possible. While this method of procedure has the merit of safeguarding health, it has the drawback of entailing much unnecessary expense. As a result, the price of Certified Milk has been so high that it has never become a considerable part of a city milk supply.

The statement that the accepted methods of barn management were approved in the absence of any scientific measurements of their relative importance will appear to many as extreme, and yet in most particulars it is literally true. We are still groping in the dark, with the exception of some information regarding the influence of small-topped pails upon the number of germs falling into the milk during the milking process, and some upon the effect of temperatures on the germ life after it is in the milk. Recognizing the important influence which this lack of data has exerted upon the cost of producing good milk, exact measurements of barn factors were begun some years since. The influence of a number of the barn operations upon the germ content of the milk have been determined and the results are here presented, the details of the investigations being given in a bulletin of the New York Agricultural Experiment Station. This work is continued at that institution under Dr. R. S. Breed, while similar studies are being started at the Illinois Agricultural Experiment Station, at Urbana.

The common method of taking samples at the barn for bacteriological study is to collect the sample in a sterile test tube as the milk is poured from the pail. Successive samples taken in this way from the same pail of milk were found to vary by several hundred per cent. The technique later adopted was to stir the milk thoroughly with a long-handled, sterile spoon before taking the sample, and to take the sample with this spoon.

The question of reinfection of utensils after steaming received some attention. At the experiment station where these studies were carried out, the building where the utensils were steamed was about twenty rods from the stable. The milking pails had an oval opening, 5x7 inches, and during this test the openings on one half of the pails were protected by cheese cloth

up to the beginning of the milking operation, while the duplicate pails were not given this protection. Under such conditions the germ content of the resulting milk was one hundred and sixty per cent higher in the unprotected pails. This would suggest that where proper care is not given to the protection of the utensils after steaming, the contamination of the utensils may counterbalance the care given to the cleanliness of the cow.

There are few things in connection with Certified Milk which have received more stress than the necessity for a scrupulously clean stable, frequently whitewashed and free from dust.

The stable being studied had a wooden ceiling and side walls. The walls and ceiling were left without any attention for many weeks, until they were well covered with dirt and a modest accumulation of cobwebs, and the stanchions were well covered with dust. The germ content of the milk obtained from six of the cows was carefully determined for six successive days.

The interior of the stable was then plastered, the stanchions cleaned thoroughly, and the germ content of the milk from these same cows determined for another six days. The germ content of the milk obtained in the clean, freshly-plastered stable was essentially the same, but averaged slightly higher than that from the dirty stable.

The effect of whitewashing upon the germ content of the milk was studied in the same stable after it had been used approximately one year. In this case the content of the milk from three cows was determined for twenty days preceding and for a like period following the whitewashing, and there was no measurable influence exerted by the whitewashing upon the germ content of the milk.

It can hardly be said that the conditions in the stable were so bad that the effect of slight changes was obscured, since none of the one hundred and forty-six samples of milk showed a content above 10,000 per c.c., few of them ran over 2,000 per c.c., and the average of all of the samples was under 1,200 per c.c.

While it would be unwise to conclude from this data that the cleanliness of the barn exerted no influence upon the germ

content of the milk, these results suggest quite strongly that we have overestimated the influence of the barn in this connection.

The practice of clipping the udder and flanks of the cows used in Certified Milk production is well-nigh universal, and is strongly supported by a prior reasoning, since it evidently makes it easier to clean the animal. A very extended study of the influence of the clipping process showed that when the cow was dry-cleaned, either by hand or by the vacuum machine, the resulting germ content of the milk was higher from the cows which had been clipped. It should be clearly understood that the effect of clipping was not tested in connection with the washing of the cows.

The last revision of methods and standards recommended the cleaning of the cows with a vacuum machine. An extended study of the influence of the vacuum machine showed that its results upon the germ content of the milk were no better than when the cows were dry-cleaned by hand at the rate of a cow each thirty seconds. I think that you will agree that this was not a very high degree of efficiency. When you consider that it takes more than twice as much time to attain the same degree of efficiency in cleaning with the vacuum machine as with the ordinary hand process, in addition to a heavy expense for machinery, you will appreciate that the "Methods and Standards" were not always based on a careful consideration of economy of production.

These results are presented here for the purpose of calling attention to the need for a careful determination of the actual influence of the various factors which affect the production of Certified Milk, and with the hope that such presentation will stimulate further study of these factors.

The President: "This is a very interesting paper, which we can now take up for discussion."

Dr. Ludlum: "I think this is a very suggestive paper. The item of most importance, of prime importance, is the actual milking process. The appearance is of importance, too; but, as Mr. Miller said in his paper awhile ago, some things

are psychological and are directed to appearance and the effect upon the community—the lay community. The cobwebs in a barn, or a failure to whitewash—say that the stalls are not as white as they may be—these might not affect the cleanliness of the milk to any material extent, while the scrubbing of the hands of the milker—the cleanliness of the hands of the person immediately superintending it—is of vital importance."

Dr. McCleave: "I would like to ask whether or not these tests were made both with the part-opening and wide-opening pail. If not, it would seem to me that the matter would be more accurately determined by the use of the wide-open, small pail. The value of this work would be to show that the safety lies in the use of the small opening, rather than the pail with the wide-open mouth."

Dr. Van Derslice: "I am very glad we have this paper, because it emphasizes the trend that is taken in the direction of clean milk and equipment. It is the milker, the personal equation of the milker, and not the equipment. In regard to labor-saving apparatus, from our point of view it is not so much a matter of economy, but a matter of getting labor. We find that we can get men to work if we make things easy for them, and so we find that many of our farmers are putting in all sorts of apparatus—not that it is cheaper, but that it is one way to make our very transient labor a little more stable."

The Secretary: "This is an interesting paper, and one that is perfectly safe to present to this body; but I believe if the facts underlying it were given out broadcast, it might have an unfortunate influence on the public. I believe Mr. Harding is right when he says that the Milk Commissions may possibly overvalue the technique in a way; but I am a great believer in the psychological effect of the equipment. I agree with the idea that it is 'the man behind the cow' that is finally going to make clean or dirty milk; but I believe that the man behind the cow is affected by the surroundings and environment. I visited recently the university dairy at Madison. It is very unfortunate that the University of Wisconsin is

running the sort of dairy it is. That dairy is anything but a model, for it should be an object-lesson to every student going through the university. The ceiling is unpainted, cobwebs are on the side-walls and ceilings. They are using the antiquated open pail. The cows are not clipped, nor the udders washed. The milker merely rubs off the loose dirt with his hands, and then proceeds to milk. Again, the fore-milk is placed in the bucket,—not discarded. The milk is taken to the so-called cooling room and there is simply cooled by being set in a tub of water. The citizens of Madison come from great distances for this milk, for it is not delivered by the dairy. They think it represents the best quality obtainable in pure milk. One particular bucket that I saw had the whole top covered with manure. While we may be considered cranks on the subject of dairy hygiene, I believe that the Dairy Department of the University of Wisconsin needs to take account of its methods of milk production. I think it is unfortunate that a university should send out students who have acquired careless methods."

The President: "We would like to hear from Professor Dowling, President of the Louisiana State Board of Health."

Doctor Dowling: "I have made a personal visit to most of the dairies of the State. I tell them what they must do to meet the requirements. This was a burdensome undertaking, but it was done for educational effect and as the first step to insure protection of milk. In my home city the dairymen showed no disposition to co-operate. Four months ago I took thirty-two injunctions, prepared by the attorney-general of the State, to this city. They were executed by the sheriff, and seventeen out of thirty-two dairies were closed until they made preparations to meet our requirements, which are that they should score not less than 50, according to the score-card adopted by the American Dairy Association. A great many of these dairies would not have scored ten points. We have had trouble also with some of the doctors. In one town where we have two men to inspect dairies, they reported twenty-six

people, besides the regular dairies, selling milk; among them were three doctors. One of the doctors was filling his yard with manure, and in this place he was doing his milking; he had three cows; he said the reason he sold his milk was that a large part of his practice was among the mothers of babies who had to buy milk, and he was supplying them. It was about as bad as that produced by any dairy in the State, with the bacterial count up in the millions, but it was only after a great deal of persuasion that we succeeded in convincing him that he, like others, must meet the requirements or stop selling. We should not overlook sources of supply other than from dairies; there are any number of places where they have cows, and they have one or two gallons more than they need. They want to sell it to the neighbors. We hold any man who sells milk should be required to meet the regulations—whether he sells one quart or a hundred gallons—and notice to this effect is given to each dairyman and posted in various cities and towns. We have now in operation dairies supplying Inspected Milk. We hope within a reasonable time to have a number of dairies selling Certified Milk, and a larger number furnishing Inspected Milk. I don't drink milk unless it is standard. In one hotel I ordered a glass, and they furnished with it a large piece of manure. The waiter said, 'Let me bring you another class,' and carried that glass out. I asked him where he had got the second glass, and he finally admitted it came out of the same container. This may not be worthy of mention, but it shows the lack of a milk conscience. But in the course of time I know in Louisiana we will have improved conditions."

Dr. Harding: "No tests were made at this time in comparing the open and closed pail. This had been done previously, and these results were published as Bulletin 326 of the New York Agricultural Experiment Station. Of course, the closed pail shuts out somewhere from one half to three quarters of the contamination. As I said, wet and dry clean-

ing were not contrasted, because milk of a low germ content—around 1,200 c. c.—can readily be produced without the expense and bother of moist cleaning of the cows. Accordingly, using water on the cows seems to be superfluous and has never been resorted to in this barn. In this experiment barn the cows were cleaned by the vacuum process for a considerable time, in order to get the men accustomed to this process, still the men always preferred the hand cleaning; and the machinery is not a satisfactory thing, either from the standpoint of pleasing the men or of getting the work done. This does not prove that some satisfactory cleaning machine may not be developed later. Now, at the Wisconsin Experiment Station—as an old Wisconsin man, and reasonably familiar with conditions there—I think a word ought to be said on the subject of the criticism of that particular dairy. The criticism on the method of cooling and the use of open pails was probably a fair criticism. There has been one thing that has come out of my own work—namely, a lack of confidence in my own ability to foretell without measuring the influence of various conditions on milk. Ten or fifteen years ago I was reasonably sure of a good many things that I am not so sure of now in regard to this analysis of surrounding conditions, and nothing surprised me more than the results from that study of clipping—to find that the clipped cows had more germs in their milk than unclipped; and only after I had a second man conduct the test for some months did I become convinced of the accuracy of the results. I spent between $600 and $800 testing out that one point. The point is simply that the dirt which gets into the milk from a fairly clean cow is largely the scurf from the skin. If the coat is long and the brushing removes the loose dirt from the udder, the hair mats down and holds the particles of the epidermis so they do not get into the milk. If the udder is clipped short and the brushing and rubbing dislodges any of the outer skin, it falls into the pail, with an effect on the germ content. A man who has not actually measured these things, in arguments of this sort, is liable to go astray in more than fifty per

cent of his criticisms. In the absence of data, we all did the best we could.

"At the State fair at Syracuse the last two or there years there have been exhibits of milk for scoring, and a certified class has been represented—some forty samples each year—and visible dirt was in practically every one. I have never yet seen a quart of thoroughly clean milk, although I have had milk from the cleanest dairies, I suppose, in the United States."

Dr. Coit: "I have very frequently observed milk produced on the plan outlined here during ten years, and with visible dirt discovered but twice in that time. It may be that there is no milk without manure contamination, but visible dirt could not be found but twice in ten years."

Dr. Harding: "I should say finding things depends, after all, in the last analysis, on how carefully you look. In many cases we find that dirt—visible dirt—carries surprisingly little bacteria, instead of much, as we used to think. There is a surprising lot of sterile dirt. Dirt does not always mean germ content in the way in which we use it. My reason for saying the criticism of the Wisconsin dairy was rather dogmatic is that the bacteriologist, Professor Hastings, made a study of germ content in that barn, and he tells me that the milk produced there is, as far as the germ content is concerned, well inside of the certified limitation."

The President: "A motion has been made and seconded that we adjourn and that the American Association of Medical Milk Commissions convene here in executive session." Carried.

EXECUTIVE SESSION.

The President: "It would seem wise to the Chairman that we have a short session this afternoon. The Council has a report to make at that session, and we have some scientific papers and reports of Commissions which could be brought up at that time."

Dr. Ludlum: "For the sake of convenience, if it is in order, I will move that we adjourn to meet at 1:30, at the Radisson, in executive session."

Dr. McCleave: "I would amend the motion, and make it 2 o'clock."

The motion was seconded and carried. Adjourned.

FRIDAY, JUNE 20, 1913, 2 P. M.

The President: "The meeting will please come to order. The first paper this afternoon is a paper by Dr. M. J. Synnott, of Montclair, New Jersey, and the subject of this paper is, 'The Public and Professional Confidence in Certified Milk, and the Basis for This Confidence.'"

THE PUBLIC AND PROFESSIONAL CONFIDENCE IN CERTIFIED MILK, AND THE BASIS FOR THIS CONFIDENCE.

Martin J. Synnott, A.M., M.D., Montclair, New Jersey.

President New Jersey State Pediatric Society; Pediatrist to Saint Vincent's Nursery and Babies' Hospital, Montclair, and to Saint Mary's Hospital, Orange, New Jersey; Member Essex County Medical Milk Commission, etc.

Prior to the formation of the first Medical Milk Commission, in 1892, under the auspices of the Practitioners' Club of Newark, New Jersey, Dr. Henry L. Coit, to whose initiative and foresight this whole propaganda for pure milk has been due, had for many years been studying the problems involved. Until 1888, when his activities began, the production of pure milk as a sanitary and prophylactic science had been an absolutely unexplored and uncultivated field.

Strange as it may seem, even educated physicians had little knowledge of the importance of clean milk, and of the dangers from contaminated milk; or if they did, the task of attempting

to better conditions among dairymen, and to educate the public to demand a pure milk supply and to be willing to pay for it, seemed no doubt a hopeless one.

I think, therefore, I may state without fear of contradiction, that to Dr. Coit belongs the whole credit of initiating this crusade, and to his almost apostolic zeal is due the remarkable success which the movement has attained and is destined to attain.

While methods and standards for the production and distribution of "Certified Milk" have been elaborated to a high degree of perfection, it is remarkable to note that every fundamental principle was grasped and every important requirement provided for away back in 1892, when Dr. Coit, acting for his Essex County Medical Milk Commission, drew up his original code with Stephen Francisco, of Fairfield, the owner of the first Certified Milk dairy in the world. A year or two ago, while visiting the hospital of Toronto, the writer spent some time in investigating the local milk conditions there. He learned that Certified Milk was produced in several dairies according to a law recently enacted there; and that when the committee having the proposed legislation in charge had studied the subject very thoroughly and intelligently, they had finally adopted as their basis Dr. Coit's code of 1892, without a single important change or modification, being unable to find anything of importance which he had not provided for.

Following the lead of the original Commission, similar organizations have been appointed, until now nearly one hundred are in existence. Because of the urgent clinical aspects of the question, which appealed strongly not only to physicians and health boards, but to the public as well, it has not been difficult to secure co-operation in an organized effort to reform. The necessity for clean milk in the feeding of infants and young children is now generally recognized, and laws have been enacted in many States which make it possible to improve conditions in cities and up-to-date municipalities when they are found to be inimical to health and safety. Health departments have been made to realize their duty toward the public in the matter, and

the public has learned it has a right to expect certain things from the dairymen, and has begun to insist that these requirements be fulfilled.

In 1906 this federation, known as the American Association of Medical Milk Commissions, was formed, with the purpose of extending the system and harmonizing and standardizing the requirements for Certified Milk. And while all of our Commissions have not realized the importance of the work which they were organized to perform, and some have lapsed into indifference and carelessness, or have failed to become aggressive leaders in their communities, much good has nevertheless been accomplished by the example and precept of other Commissions whose work has been more conscientious.

The personnel of each Medical Milk Commission requires for successful work a number of men of such standing in the community that they will, *ipso facto,* command respect and attention, of mature judgment and experience, and with sufficient interest to devote their time and labor to the work without financial recompense.

The propaganda for pure milk is necessarily mainly an educational one. The public must be taught its importance. Such an undertaking takes time, and discouragements are bound to be encountered. At present we must close our eyes at times and be satisfied to make progress slowly but surely; and while conditions, even in the best managed dairies, are very far from ideal, they are certainly far in advance of a few years ago. Carping criticism should be condemned, and every effort, no matter how feeble, should be encouraged and praised.

It has been claimed that the methods and standards which we have adopted are too high and that they are not practical. This is a mistaken idea. We must aim at perfection, and we should not be satisfied until it has been attained.

Many dairymen are operating their plants voluntarily in a manner to warrant the certification of their output. Oftentimes they hesitate to request medical supervision through mistaken impressions. Such men should be encouraged and their ambitions stimulated to produce a high grade of Certified Milk. When

properly explained, no dairymen of ordinary intelligence need hesitate to comply with our standards. He must of course, be a man of honor and of sufficient financial ability to provide proper dairy facilities and meet the other necessary expenses involved in the employment of experts for hygienic, biologic, veterinary, and medical control of his plant. But if he is intelligent, it will not be difficult to convince him that the increased revenue to be obtained from the sale of Certified Milk will amply repay him for the outlay.

The hygiene of the dairy, which should be under the supervision and control of the verterinarian, if properly provided for at the start, involves comparatively slight subsequent expense. The tuberculin testing of the cows, and the removal, isolation, and disposal of sick or emaciated animals from the herd, with proper recording and identification, are matters of detail quite within the intellectual limits of the average dairyman, particularly if he knows a Medical Commission is going to check him up.

As to the bacteriological requirements, the dairymen need have no fear—because it follows as a matter of course if his dairy hygiene is correct, if his cows are healthy, his milk cooled promptly and kept at low temperature, and the handling and transportation done in a clean manner, the bacterial count need not concern him, because it is bound to be low.

The bacteriological and chemical examinations made by the experts employed by the Medical Commission should be thorough, but should be made in a manner just to all concerned, so as not to entail upon the dairyman unnecessary expense.

The medical examination of the employees and the supervision of their health and personal hygiene should be entrusted to some competent and conscientious physician, preferably one residing near the dairy, who will be paid for his services by the dairyman, but who will be responsible to the Medical Commission and subject to its directions. He must be impressed with the importance of thoroughness in his work, and he should impress upon the men at all times the importance of personal cleanliness.

The employees should be immunized against smallpox and typhoid fever, and every precaution taken to exclude typhoid and venereal disease carriers. Where a dairy employs its own microscopist, it would be quite feasible to make its own Widal and Wassermann tests and examinations of the stools of all new employees.

The superintendent should watch the men closely for evidences of carelessness, and cleanliness should be encouraged by the dairy management by providing ample bathing facilities, the use of which should be compulsory. There should be no economy in the use of soap and towels, and clean beds, in clean, well-ventilated dormitories provided for all employees.

The principles involved in this system of producing Certified Milk have been summed up by Dr. Coit under the three heads of 'Cleanliness,' 'Caution,' and 'Control:' Cleanliness as applied to everything and every body; caution as applied at every step in the collection, handling, and transportation of milk; control as exemplified in the contract supervision of methods of production from the first step to the final delivery of the project. To accomplish this the Medical Commission must assume leadership by taking the initial steps in selecting the highest grade of milk available for medical purposes; it must arouse the interest of the public and profession in pure milk; it must absolutely control the production of the grade of milk known as "Certified;" and finally, it must teach the profession and the public how to handle and use clean milk to the best advantage in the protection and preservation of human life.

If the dairymen and Commission both do their duty, and the methods and standards of the Commission are honestly and intelligently carried out, a "Certified Milk" is produced which will be found of incalculable value in the treatment of dietetic and nutritional disorders of childhood, and a great factor in the reduction of infant mortality. Add to this the confidence and security of the public resulting from the sponsorship of physicians of prominence certifying to the purity of the milk, and we believe it will be readily conceded that the acquisition

of Certified Milk constitutes one of the most important steps in the prophylactic hygiene of infancy and childhood.

As to the incompetent or careless Commission, I cannot express myself better than by quoting Dr. Henry L. Coit, in an address delivered by invitation before the Philadelphia Pediatric Society, May 18, 1912:—

"A Medical Milk Commission which fails to carry out any one or more of the essential parts of the system does not represent the system. The product which such Commissions permit to be called certified represents a serious menace to the Certified Milk system. Such certification established a false security in the minds of physicians and the public who have learned to trust the system and the name. Such certification savors of deception, and, as respects the milk itself, is a misbranding and falsification. The work of such Commissions is a detriment to the cause of Certified Milk, and reflects upon the reputation and diminishes the influence of the American Association of Medical Milk Commissions. A few such Commisions have, unfortunately, gained admission to our Association. No chain is stronger than its weakest link, and any Commission which weakens the strength of this National chain should not be tolerated as a factor in the government of legislation of the Association."

Under existing conditions ideals are of course impossible of attainment; so much depends upon the honesty of the dairyman, the intelligence of his employees, and the efficiency of the physicians on the various Milk Commissions. Let us aim high, and if we miss the mark, let us not be discouraged by criticism or rancorous jealousy, but keep on trying. Our work should be always constructive, never destructive.

The President: "We have heard this very interesting paper by Dr. Synnott, and the discussion is now open."

Dr. Harding: "I have, as all other members have, enjoyed this good presentation of this subject. There is a reference

in it to the influence on the fat content and composition of milk which is exerted by the diet which might lead the dairymen to think that the doctors are laboring under the impression that the fat content and the composition of milk can be changed by the diet; and that matter was settled so many years ago that when a dairyman hears that, he immediately concludes that the doctor knows nothing about milk, and the two won't work together. There was a clause in the laws which the New York Board of Health sent out regarding the cleaning of stables twice a day before milking, and just one little statement queered the whole thing with the farmers and retarded progress. The Rochester Board of Health undertook also to require some things in connection with a dairy—of no particular importance—and it did ten times the harm that it was worth in retarding progress. These little slips make it hard to get on with the dairymen."

Dr. Synnott: "The point I wished to make—perhaps I was unfortunate in my wording—was that the Medical Milk Commissions should be made up of men who are posted in dairy hygiene and matters pertaining to the requirements laid down by the code which we have adopted. The Commission should be in position to straighten out any difficulties in the minds of the dairymen. Sometimes, as I stated, there are dairymen in a community, or serving milk in a community, who with very slight changes in their dairies could produce a Certified Milk, but who, through mistaken ideas of difficulties involved, hesitate to apply to the Commission for certification, and the Commission should be made up of men who are capable of straightening out such doubts and in position to assure them that the difficulties are not insurmountable."

The President: "Our next paper on the program is by Dr. Williams—'The Opportunities of a Milk Commission for Public Service.'"

THE OPPORTUNITIES OF A MILK COMMISSION FOR PUBLIC SERVICE.

John R. Williams, M.D., Secretary Milk Commission, Rochester, New York.

If a Milk Commission is to confine itself to the sole duty of securing a few quarts of milk of high degree of purity, and at a cost regarded as prohibitive by most of the community, it may serve a useful purpose in demonstrating that pure milk is a possibility, but it will have done but little in solving the general milk problem. Beginners in the Certified Milk movement are usually disappointed by its slow growth and by the exceedingly limited demand for the milk. Commercially, the production of Certified Milk must be looked upon as a rather precarious business. Few producers have succeeded in putting it on a paying basis. Accordingly, if a Milk Commission rests content to supervise and certify to the small amount of pure milk for which there is but little demand, its duties are not likely to be arduous and it will probably become like many other committees in medical societies, an organization in name only. The writer has interpreted the Milk Commission movement to mean an invasion of all the fields of human activity which have to do with the welfare of humanity in which milk is a factor. To be really effective, any agency which wishes to serve the highest purpose in this field must view the problem as a sociological and humanitarian question. To limit a Milk Commission to medical work is to narrowly circumscribe its efforts and usefulness. A better understanding of the opportunities of a Milk Commission for public service may be had from a review of some of the activities of the Rochester Milk Commission.

The first important undertaking of the Commission was a study of the use of milk in the local hospitals. These facts were brought out: One of the large hospitals owned its own farm and cattle; the milk was fairly clean and of good quality, but the cattle were untested for tuberculosis. The other three hospitals bought their milk by contract, under a bidding system; the main factor was the price; there were no provisions in the

contracts which insured either safety or purity. The milk was found to be variable in quality and cleanliness. A few quarts of Certified Milk were used in one of the hospitals for infant feeding. These hospitals refused to pay a price which would enable the dairyman to guarantee a tuberculin-tested milk of low bacterial count or of assured cleanliness. The local tuberculosis hospital, thanks to the wise direction of its superintendent, Dr. M. F. Leary, asked our Milk Commission to specify the kind of milk that should be used, and to pass on the sources of supply of all bidders. This was done, and the Iola Sanitarium, of Rochester, is the only hospital at the present time serving its patients with milk of dependable quality and under constant inspection and control.

The next important work in this line was the study of the use of milk in public schools. With the assistance and co-operation of the Board of Education, a survey was undertaken and much important information brought to light. It was shown that most of the milk used in the public schools was fed to little children, chiefly kindergartners. The children paid from one to three cents each for their daily supply, the quantity served varying from three to six ounces. The rate per quart varied from four cents to twenty cents. The money to pay for the milk in some schools was contributed partly by the children, partly by the teachers, and sometimes by neighborhood associations. In all cases the deficits were made up by the teachers. The records of the Health Bureau and inspections made by our Commission showed that the worst milk sold in Rochester was being fed to these children. The Health Bureau declined to assist in remedying the condition, so that the Board of Education was obliged to appeal to our Commission for aid. A resolution was passed forbidding the use of any other than Certified Milk in the public schools, and when certain difficulties in the way of delivery can be solved, we hope to make this effective. Our Board of Education is to be commended for its high stand in the matter, as are our Certified Milk producers, who volunteered to furnish Certified Milk at cost so that the school children of Rochester may have pure milk.

The general criticism aimed at the Certified Milk movement in Rochester is that it does but little to relieve the needs of the community, and at the best it helps only the rich. This criticism is in part merited although we hold that it is as important for the welfare of the community to conserve the lives of the most intellectual and prosperous as it is those of the poor and ignorant. In this connection it is thought wise to determine how important milk is as a factor in the community. This study extended over a year and resolved itself into four separate investigations:

1. A study of infant mortality and the relation of market milk thereto.
2. A study of the use of milk in homes.
3. A study of the manner and cost of market milk production.
4. A study of the problem of milk distribution.

These studies were begun as sanitary problems, but they were not long pursued before it became evident that they were mainly economic questions.

In the study of infant mortality, it was shown that the most potent cause of infant mortality was bad care and neglect in the home, and that milk is only one of many factors entering into the problem. It was further discovered that condensed milk and store or loose milk were used mainly in those homes where ice is not afforded, and that their use of these is a great factor in the infant mortality problem than is the use of bad cow's milk.

It was also discovered that the milk agitation which has been carried on for so long in our community has served to develope a feeling of distrust regarding the use of milk. Consumers use as little as possible, and as a rule have no notion of the economic or nutritional value of it. In many homes it is avoided altogether .

In a study of milk production we learned that many farmers were making milk under unfavorable and uneconomic conditions, and that there was great waste and bad management. The farmers at first viewed our work with suspicion, and offered the usual criticism that city doctors know very little about dairying and are pure theorists. They soon saw the sense of it,

however, and met us in convention a number of times to discuss ways and means of improving conditions in dairying. Only a few months ago three hundred and fifty milk farmers gathered in Rochester to discuss the public milk problem with the Commission. This was the largest gathering of its kind and the first for its purpose that our city has ever known. A short time before this meeting we held another, in which we attempted with fair success to get producers, distributors, as well as consumers together. The meeting was well attended, and served to focus public attention on the milk problem in a very effective way.

The most important conclusion from our study of production was that farmers are not adequately compensated for their work, so that they cannot afford to produce pure milk at the price received. The milk now sold as ordinary milk represents the minimum of cleanliness and purity necessary to comply with the law.

In the study of distribution, a most exhaustive examination was made of the business and operations of all the dealers delivering milk in the city. This study was reported before this society at its last meeting. In brief, it was shown that there is an enormous waste in the distribution of milk. That the business as now carried on is uneconomical, and not only adds very materially to the burden of the consumer by making the cost of milk high, but it, more than any other reason, serves to keep down the quality and purity.

In the course of our investigation in the homes we were constantly impressed with the inter-relationship of the milk and ice problem. It was then determined to make an investigation of the means of caring for milk and other perishable foods in the home. If it can be shown that the average home has no facilities or insufficient means for protecting milk from bacterial decomposition, there is little use in taking extraordinary pains to give that home milk of high degree of purity. The results of this ice investigation are the subject of a special paper before the American Medical Association, but briefly, the significant findings are these: In the study of 5,431 homes, representing

all classes of people, there were found 2,243 homes in which ice was not afforded. In a special study of more than five hundred homes, not one living-room was found in which food is stored which had a temperature of below 60°, although it is well known that milk spoils rapidly above 50°. Not one cellar was found having a temperature below 55°. In two hundred and forty-three homes in which refrigerators were found, one hundred and forty of these refrigerators were found to have a temperature above 50°. Nearly 70 per cent of the refrigerators in the homes of the working people and 45 per cent of the refrigerators found in the homes of the well-to-do were found to register above 50°, hence were worthless for preserving food. The high temperature of these refrigerators was found to be due mainly to their worthless construction and the inefficiency of the insulating material used. Seventy-five different makes of refrigerators were found among the two hundred and forty-three studied. Enough data was gathered to warrant the general conclusion that few homes have adequate means for the proper protection of milk in the warm months of the year.

In addition to the foregoing studies, our Commission has assisted and co-operated with numerous other civic organizations in general propaganda of public health matters. It assisted the Rochester Retail Grocers' Association in a campaign for pure food, and it co-operated with the Rochester Health Association in a tuberculosis exhibition. It has sent educational exhibits of its work to other cities and has affiliated with numerous other organizations engaged in public health work. At the present time it is acting with our local Chamber of Commerce in an endeavor to remedy some of the most evident evils. With this body, it scrutinizes all State legislation which has to do with the milk problem, and has rendered effective service during the past year in opposing unwise bills.

A review of the experiences of our Commission leads to the conclusion that the opportunities for public service are unlimited. A Milk Commission engaged in such service, to render the highest good and to be most effective, should be non-political, non-salaried, and composed of representative physicians. It

should be actuated and controlled by the highest ideals not only in the production of Certified Milk, but in its dealings with the public, that its actions may inspire confidence and respect.

Men selected for a Milk Commission should be aggressive, studious, public-spirited, and self-sacrificing. Such a Commission may create a powerful public sentiment and will extend its influence not only to consumers, but to those engaged commercially in the milk industry. It is not always necessary, oftentimes it is not desirable, for such a Commission to frame legislation. Its highest function is educative. A Commission measuring short of these ideals and standards would not have survived in Rochester, nor will it endure the test of time anywhere.

The President: "We have heard Dr. Williams's most interesting paper, and it is now open for discussion."

The Secretary: "We had a paper this morning on the efficiency of a Milk Commission. If my humble judgment is worth anything, I know of no more efficient Milk Commission in the country than the Rochester Commission. The problems which they have devoted themselves to are economic problems, and are fundamental to the welfare of the community. I heard a paper some time ago by Dr. Williams on 'Ice.' The problem of human conservation, it seems to me, has been analyzed very well in these two papers. We have heard so much about the high cost of living, and Dr. Williams showed that only twenty-five per cent of ice-chests are efficient, and that less than half the people have ice-chests. We have been working along this line, striving to get clean milk for homes; but when the milk is subject to such conditions after it reaches the home, it is a waste of effort to follow the milk to the homes unless we see that it is preserved there. Dr. Williams made a statement which was corroborated by another physician there, that the ice-wagons in delivering lose forty-five per cent of their product, and that a large percentage of the cost of ice can be chargeable to the waste due to allowing half the ice to leak on the streets. I think the members of this Association might well take the

trouble to look up Dr. Williams's paper, when it appears in the Journal, on the question of ice-chests. I believe it should be circulated in some way; and if the doctor will see to it that we have reprints, I would like to have the Secretary of the Association instructed to send reprints of that paper to all the Commissions, and let them work that problem out in their local communities."

A Member: "I shall be very glad if Dr. Geier will not forget to distribute the reprints of Dr. Williams's article. I am sorry that I did not hear that paper myself, yesterday, but I just want to say a word in corroboration of the statement that he has alluded to. I have made observations, although I have not tabulated them, in regard to the inefficiency of ice-chests, and not only in the poorer classes, but even in the better homes, one is surprised with the frequency with which the temperature in an ice-chest is over fifty."

Dr. Harding: "There are some little side-lights on this paper. For many years we have rated Rochester, New York, as a little the highest in the matter of civic milk improvement. It is supposed to represent one of the highest points. If an analysis of the situation there shows as much need of improvement in actual conditions as this paper indicates, is it not fair to inquire what is the actual condition in the other cities which enjoy such an enviable reputation in the matter of good milk supplies? I believe that a careful survey of the situation will show that in the last ten years we have not made the amount of progress which we are congratulating ourselves upon having made."

The Secretary: "May I suggest that you call on Mr. Kelly, of the Department of Agriculture, who has done some work with Dr. Williams in this matter?"

The President: "We would be very glad indeed to hear from Mr. Kelly."

Mr. Kelly: "I am sure I can have nothing to add to what Dr. Williams has already said, as it is a subject of which I know very little. But I do want to make this point. I fully

agree with Dr. Williams that it is one of the functions of the Milk Commissions, as well as any other body that has control of any phase of the milk supply, not only to concern themselves with the actual production and delivery of milk, but to follow it until it is consumed. One of the greatest mistakes that most of the city Boards of Health have made in the past in the control of milk supplies has been, when the milk had passed through the hands of the retailers and on to the delivery wagons, they washed their hands of the whole affair. I have investigated into the condition of dipped store milk. Unfortunately, at the present time there are great numbers of stores in which a vast amount of milk is dipped out—I mean in corner groceries or delicatessen stores; and it might be better to abolish that class entirely and demand that only bottled milk be sold. But that is a large problem. In some cities conditions are such that the poor consumer has no ice in the home; if we make him buy bottled milk, the only place that he can set that milk is on the window ledge or into the room where it is 80° or 90°. So that we have worked on this problem of dipped store milk for cities that will not require bottled milk at the present time. We have worked for years with those who sell dipped milk, with the hope that more or less of the corner groceries will be eliminated from the problem, by a careful survey of all places selling dipped milk. If dipped milk is to be sold, it should be only from carefully supervised stores where it can be kept cool until used, and the consumer goes there and buys enough at one time for one feeding for the baby—one or two cents' worth of milk. We realize that the care of the milk in the home is important, and that no matter how much pains we may take with the milk on the farm, no matter how carefully we may safeguard it throughout handling and delivery, if the consumer mistreats it in the home, all our pains practically go for nothing; so that it seems to me that the Commissions have a great deal before them in the educational work with a good many people who use Certified Milk, as to its care in the home."

The President: "The next paper is one by Dr. Myers, of Milwaukee, 'Some of the By-products of the Work of the Association.'"

SOME OF THE BY-PRODUCTS OF THE WORK OF THE ASSOCIATION.

A. W. Myers, M.D., Milwaukee, Wisconsin.

In surveying the effect of the Certified Milk movement in this country, and in considering the work of the Milk Commissions and Associations which have been organized for the carrying on of this movement, one is at first included to look for a direct, tangible result in the form of a large and increasing sale of Certified Milk in the communities in which these organizations exist as being the only fair index of the degree of usefulness which may be claimed for them. The fact that in many of the larger cities the amount of Certified Milk sold is only one per cent of the total milk consumption, or even less than this, has sometimes seemed a discouraging feature of the situation to those who are keenly interested in the success of the work.

But by far the greater results of the activities of the past twenty years are of a more elusive nature. Certified Milk, from its very nature, is and must continue to be a dairy product limited both in production and in consumption. But the "Certified Milk Dogma," if I may so term it, is of the broadest applicability and has had an enormous effect upon the milk situation throughout the entire country.

By the term "Certified Milk Dogma," I mean the clear, intelligible expression of the principles underlying the production of clean milk.

Of course there was clean milk here and there before Certified Milk was thought of; some producers and more sanitarians had general ideas as to how such milk might be produced. But to make the information generally available, to put it to work in the everyday affairs of the world, a definite enunciation of these principles in a concrete form had to be provided. It was provided in the Certified Milk dogma.

Now, to realize the extent of the influence of this body of doctrine in regard to the gospel of clean milk, one has only to read a modern city milk ordinance, or a bulletin on milk of the Agricultural Department at Washington or of a State agricultural station, the report of such an organization as the New York Milk Committee or of the Massachusetts Milk Consumers' Association, or a current book on dairy hygiene.

I do not mean that the Certified Milk requirements are copied in them; there may be no reference whatever to the term "Certified Milk." But the standard of comparison is there. The knowledge of what clean milk is, and how it can be obtained, is there. The results of the work which has been done to improve and to guard Certified Milk are there, showing themselves in almost every paragraph.

The extent to which the educational influence of Certified Milk has penetrated among all classes of people, producers as well as consumers, I believe to be much greater than is generally realized. It is frequently said that it has had no influence upon the production of the greater portion of the market milk of the large cities. This is true to the extent that in most places the average producer is not making any attempt to adopt the methods of the Certified Milk dairy. On the other hand, the average producer is beginning to feel the uplifting hand of the milk inspector from the nearest large city;; but this inspector, with his possibilities for good, is usually the result of the better milk ordinance, which, in turn, results from the clearer understanding of the milk situation made possible by the introduction of clearly defined standards of comparison.

Now, even though the average producer is not attempting to copy the methods of the Certified Milk dairy, he has been educated by them to some extent; he knows in a general way what they are. The reason why he does not try to apply them is simply that he is not paid to do it. At the present time the average producer of milk is not paid anything extra for the additional care and labor which are required to make clean milk possible.

When the educational process has extended a little further,

however, and the impending readjustment of milk prices occurs, in all human probability there will be an allowance of a small premium for cleanliness, and then a fuller realization of the extent of the educational process among the producers of milk may be gained. How small a premium is required to serve as an activator of this latent energy is shown by the excellent work of the New York Dairy Demonstration Company of the New York Milk Committee.

The following premiums have proven efficient for the purpose of stimulating the farmers to make the extra effort needed:

For milk from tuberculin-tested cows.....per quart, ½ cent.
For adopting sanitary measures..... " " ¼ "
For milk below 10,000 bacteria per c. c..... " " ¼ "

With regard to the extent to which these educational features of the Certified Milk movement have penetrated among the great mass of the consumers of milk, one is obliged to judge largely from one's personal experience. It seems to me that the effect has been very great. An understanding of the different grades of milk and of their uses was formerly an indication of a very high degree of intelligence, but now it is such a commonplace discovery, even in families in the humblest circumstances, that it ceases to arouse surprise. This is not due merely to a keener interest in the subject of pure foods in general. As I have said before, it is simply because the standards of comparison have been presented in a concrete form, intelligible to the ordinary observer.

Neither is it necessary to exclude the medical profession from the list of indirect beneficiaries of the educational work of Certified Milk. In the earlier days it was no uncommon thing for the family doctor to think that the most preposterous mixture ought to agree with the baby if it was only made up with Certified Milk. When it failed to do so, the Certified Milk was sure to receive the blame at first; and in those earlier days of the work this was often a severe blow to the cause. But by just such experiences as these the rank and file of the profession have been helped to a better understanding of milk and its uses,

and to-day even the medical student knows more of the problems concerned in the production, distribution, and use of milk than nine tenths of the practitioners of medicine did a generation ago.

It is not easy to show in figures the effects of all these elements working for good in the cause of clean milk. So many factors enter into the gradual improvement in the mortality percentages for the periods of infancy and childhood that the influence of the Certified Milk movement upon them is hard to trace.

Some very suggestive figures have been given by Delépine, however, based upon work done for the betterment of the market milk of Manchester, England:

"Milk arriving in Manchester from various farms is frequently tested by inoculation, and when the milk coming from a farm is found tuberculous, that farm is visited by a veterinary inspector, who examines all the cows and takes samples of milk from the udders which appear to be affected with tuberculosis. Then samples are tested by inoculation, and the farmer is requested to isolate any cow found to produce tuberculous milk. He is also advised to have such a cow slaughtered as soon as possible.

"At the beginning of the work in 1897, 17.2% of the samples examined were found to be tuberculous, while in 1910 the percentage had fallen to six. From this it will be seen that the quantity of tuberculous milk reaching Manchester has been reduced to nearly one third of that which it was fourteen years ago. That this reduction has been obtained by the removal of cows with tuberculous udders from farms sending milk to Manchester is proved by the fact that the number of farms producing tuberculous milk has been reduced in almost exactly the same proportion."

To trace the effect of this work in the mortality rates, a study was made based upon the assumption that, "It is probable that, although pulmonary tuberculosis may be due to infection through the alimentary canal, no other organ is liable to aerial infection to the same extent as the lungs, and that the number of deaths from pulmonary tuberculosis, or from lesions of the

lungs grouped under the name phthisis, include most of the cases of aerial infection, and may be taken to indicate roughly the possible frequency of this mode of infection. On the other hand, deaths from tuberculosis of the intestines and mesenteric glands, of the peritoneum, of various lymphatic glands, and of bones, which constitute the bulk of the deaths attributable to tuberculous diseases other than pulmonary tuberculosis, may be taken to indicate roughly the possible frequency of infection through the intestine, notwithstanding the fact that a certain proportion of these deaths may be the result of aerial and other forms of infection."

Not to weary you with quotations, I may say that while for five-year periods before and after this work was undertaken the figures for the total mortality—mortality from phthisis, the mortality from all causes under five years of age and under one year of age—showed changes which were practically identical with those for England and Wales as a whole; the mortality under five years from tuberculous diseases other than phthisis showed an improvement in Manchester ninety per cent greater, and under one year fifty per cent greater, than in England and Wales as a whole.

It seems to me that the analogy is close enough to permit us to conclude that the efforts which have been made by this Association in the cause of clean milk have borne abundant fruit.

The President: "This concludes the first part of our program this afternoon. We will now have the reports of Commissions. Many of those Commissions have handed in to us written reports, and there may be other reports here that have not been handed in. If there are such reports, and this Association desires to have read these brief, three-minute reports which have been prepared, we would be glad to have them at this time."

Dr. Coit: "I would like to move that the reports of the Commissions be filed with the Secretary."

Motion seconded and Carried.

COMMISSION REPORTS.

The Medical Milk Commission of the County of Hudson, New Jersey.

The Commission continues to certify the products of the Raritan Valley Farms, Somerville, New Jersey, and Swain Brothers' Dairy, Kearny, New Jersey, and has also, since January 1, 1913, certified that of Purity Farms, Pennington, New Jersey. In addition, we have under investigation at the present time applications for certification from Ravenswood Farms, Morristown, New Jersey, and a farm operated by the Borden people at Earlsville, New York.

In consideration of the number of Certified Milk distributors in our territory, and the great distance of some of the points of production from the area of distribution, it has been found necessary to modify somewhat our system of inspection, so that now, while the members of the Commission continue to make inspections of all our farms, we have under tentative operation a plan by which much of the routine inspection is intrusted to specially appointed expert inspectors. There will doubtless be further adjustment necessary before a wholly satisfactory plan is evolved to suit our special needs.

Through increased distributive facilities our entire county is now covered, and we are in a position as never before to care for any demand, and to cooperate efficiently with the profession and the public in meeting the need for pure milk.

Respectfully submitted,

S. A. COSGROVE, M.D.,
Secretary to the Commission.

The Medical Milk Commission of Union County, New Jersey, Number Three, for the Year Ending May 15, 1913.

The Medical Milk Commission of Union County, New Jersey, Number Three, held its first meeting on December 20, 1909. It consists of twelve members, the officers being President, Vice-President, and Secretary-Treasurer.

The Commission meets once every month in Summit, New Jersey. The milk certified by the Commission comes from one farm only, the Noe Farm, Incorporated, of Madison, New Jersey. The Commission employs a competent veterinarian, who visits the farm twice each month, immediately tests with tuberculin all new cows, and tests the entire herd twice a year. The Commission also employs an able physician as medical inspector, who visits the farm twice each month and examines all of the employees. The milk is analyzed twice each month by Herbert B. Baldwin, city chemist of Newark, New Jersey. Our standards are those of the American Association of Medical Milk Commissions, of which each of our members is a member.

The Commission is divided into four committees of three members each. One of these committees visits the farm each month.

Everything at the farm is made and kept as nearly perfect as possible.

During the year the bacterial count has been above 10,000 only three times, the highest being 13,000, the lowest 2,500—the average 6,100. The B. coli communis has been found in 1/10 c. c. four times only in twenty-four analyses. The highest fat percentage has been 5.00, and the lowest 3.70—the average 4.27.

The highest percentage of total solids has been 14.81, the lowest 12.50—the average, 13.32.

The highest lactometer reading has been 119, the lowest 103—the average, 106.

Average number of cows used for certified milk, 114. Average number of quarts sold daily, 710.

During the year there has been no serious cases of sickness among the employees, and no sickness has been traceable to the milk.

The cows are fed clover, hay, ensilage, beet pulp, mixed feed, alfalfa, corn grains, union grains, sprouts, bran, and fresh-cut clover and timothy hay, and are pastured four hours each day when the weather permits. The cows are washed twice, and dried, before each milking. The milkers are required to wear sterilized canvas suits, and to thoroughly scrub their hands

before milking. The milk is cooled at once and packed in ice. The Standard Cap and Seal Co. bottle-cap is used. Everything is sterilized with steam. The Commission does not certify anything but whole milk.

DAVID E. ENGLISH, M.D.
Secretary.

Hennepin County Medical Milk Commission, Minneapolis, Minnesota, 1913.

At last report this Commission had an Inspected Milk. Very soon thereafter this was changed to a Special Inspected Milk, with bacterial content not over 50,000.

Very nearly at that time the Arden milk, certified in Saint Paul, was brought to better conditions in our city at our request and was certified by us. We receive this milk from the night's milking for morning delivery.

Just now the producer of our Special Inspected Milk is furnishing another milk, certified in grade. It will be certified very soon. He is waiting our contract.

The distribution, which was by one company, is now through two large companies and through some of the clubs and cafes.

As noted above, we have gotten the special milks into the cafes and some of the hotels and clubs.

The amounts now marketed are: Special Inspected, 256 quarts; Arden certified, 210 quarts; Gran Certified, 45 quarts daily—Total 511 quarts.

We find several persons ready to enter the production of special milks, but we are unable to encourage this as the market is not prepared for its reception.

The propaganda of the pasteurizers, with extravagant and false assertions based partly on the medical recognition of heat treatment for infant milks, has made the introduction of special milks difficult.

The Commission has lent its influence for regulation by ordinance of the requirements in milk before admission to the pasteurizing process. Milk from dairies within a hundred miles,

and some of which dairies score less than thirty in Government scores, is freely admitted to pasteurizing and then advertised as equal to special milks.

We regret that a much longer report might be made of what we have not done.

G. D. HAGGARD, M.D.,
ROBT. WILLIAMS, M.D.,
J. P. SEDGWICK, M.D.,
Commission.

Medical Milk Commission of the Buncombe County Medical Society, Asheville, North Carolina.

The Medical Milk Commission of the Buncombe County Medical Society, of Asheville, North Carolina, begs to submit the following report:

After proper organization, the Commission had application from the Biltmore Dairy, at Biltmore, North Carolina, Dr. A. S. Wheeler, manager, for permission to produce and distribute Certified Milk. After we inspected and proved to the satisfaction of the Commission that the Biltmore Dairy had complied with all the requirements of your Association for the production and distribution of Certified Milk, the said Biltmore Dairy was duly authorized to produce and distribute Certified Milk under the direction and certification of the Medical Milk Commission of the Buncombe County Medical Society.

We desire to say that there is one little deviation from the rules which we think of a decided advantage, and which we commend to your consideration, to-wit: instead of simply wiping the udder of the cow, as required by Rule 16, as adopted by your Association, May 1, 1912, the employee takes a hose and washes with the hose and with a brush the udder and entire hind quarter, including legs and feet and flank and side. Before beginning, the milker takes a cloth, as provided in Rule 16, and wipes the udder again. We think this washing with a hose of decided advantage, and commend it to your consideration.

We are of the opinion that Certified Milk is going to be popular in our city, and the probabilities are that it will be shipped to surrounding cities. All of which is respectfully submitted.

C. V. REYNOLDS, *President.*

The Medical Milk Commission of Wayne County, Detroit, Michigan.

The record of the Medical Milk Commission of Wayne County, Michigan has been uneventful during the last year. Two dairy farms, the Church and Ingleside, are producing Certified Milk. The product of the Church Farm is distributed by the Towar Wayne County Creamery; that of the Ingleside Farm by its owners, the Detroit Creamery Company. Each dairy's product has been of uniformly high character, as is attested by the various farm scores made and by the bacteria counts. In July of last year both farms were scored by a representative of the National Dairy Division, the score of one farm being 96.25, the other, 97.85. Two hundred and twenty-four counts were made since June 1, 1912, of which only fourteen were above 10,000, and one hundred were below 500. At the four tuberculin tests, thirty animals reacted out of two hundred and seventy-two tested, and were slaughtered subject to Government inspection.

In the Milk and Cream Contest of the International Dairy Show at Milwaukee, last October, the Ingleside Farm was awarded a bronze medal, second prize, on a score of 97.9 in the "Individual Certified Class," while the score of the Church Farm milk, 93.9, raised the average score of both to 95.8, the highest average of any Medical Milk Commission competing. The first prize for Medical Milk Commissions, a gold medal, was therefore awarded to Detroit. The judges were Professor Ivan C. Weld, late of the National Dairy Division; Professor W. A. Stocking, Jr., of Cornell University, and Professors Hastings and Baer, of the University of Wisconsin. These contests stimulate general interest in those localities which are represented; they have a wholesome educational effect on the em-

ployees of the farms, and bring the Commission into closer touch with the problems of the producer.

A strenuously contested law suit last November further advanced the interests of Certified and Market Milk in Detroit. One wealthy dairyman having a very fair farm, but in no way conforming to the requirements of "Certified," persisted in marketing his product as such, and finally refused admission to his premises to the health officer and chief milk inspector of the Detroit Board of Health, who are respectively the President and Secretary of the Medical Milk Commission of Wayne County. His product being thereupon excluded from the Detroit market, he brought suit against the two officials personally for $20,000 damages. After being on trial for six days, a judgment in favor of the two defendants was taken by direction of the court.

Besides the regular requirements, the Medical Milk Commission of Wayne County is gradually acquiring immunity against typhoid fever for the employees of its certified farms. No fixed rule has been made requiring this, but its advantages were explained and this vaccination has been accepted by practically all the present employees. As new ones are engaged, it will be required of them to be vaccinaed against typhoid.

Milk Commission of the Allegheny County Medical Society, Pittsburgh, Pennsylvania.

In the few minutes allotted to the report of the Allegheny County Milk Commission, Pittsburgh, Pennsylvania, no detail is permitted.

Our organization has been handicapped by an absence of the old members from the roll. The resignation of Dr. O. M. Edwards, Jr., was greatly regretted. Our veterinarian died suddenly of septic infection.

The number of dairies supplying Certified Milk is three, as last year.

Educational lectures to the residents in tenement districts have been continued under the Young Men's Christian Association course. Photographs have been shown on the screen illustrating the work of production of Certified Milk and other allied

topics. Audiences from a few hundred to a thousand have been instructed in this manner. This work will be continued during the coming summer.

The division of bacteriology of the Department of Health has given very valuable and satisfactory service in chemical and bacteriological analyses, and it is due to this excellent assistance we are able to consider our work as a success.

In the milk stations supported by the city during the summer Certified Milk is to be used exclusively. This is the first year such conditions have been established.

Chemical and bacteriological examinations are made twice weekly, while two dairies are inspected weekly and one bi-monthly, owing to its distance from the city.

The results of laboratory analysis are given to the members of the society in the weekly bulletin.

We feel that, while not instituting a more active campaign, the work of the Commission is influencing the public generally, as shown by the steady increase in demand for Certified Milk.

Annual Report of the Milk Commission of Cleveland for 1912.

A. F. Furrer, Assistant Secretary of the Milk Commission, presented the following report:

The essential factors in the production of Certified Milk are: (1) Healthy cows; (2) cleanliness; (3) adequate refrigeration; (4) efficient sealing of bottles, and prompt transportation from the farm to the city and thence to the consumer; (5) the prevention of contamination of milk by employees having communicable diseases.

At the annual test of the certified herd last May, made by our veterinarian, one hundred and forty-six cows were given the tuberculin test. Of this number, only one reacted positively. This animal was immediately removed from the herd and butchered, and the stables cleaned and disinfected under the supervision of our veterinarian. A record is now kept by the Commission of the markings and number of any animal reacting positively at the annual tests.

The excellent showing made by this certified herd in regard to the tuberculin test last spring was a source of great satisfaction to your Commission, inasmuch as it has been shown by North, of the New York Commission, that about three per cent of the certified herds react positively at the annual tuberculin test.

Inspection visits at the farm by our veterinarian were made at monthly intervals as usual, and occasionally more frequently when it was deemed necessary.

The udders are examined daily by the chief herdsman or superintendent.

The cleanliness of the animals, barns, and milk-house, as well as the technique of milking and the general physical condition of the employees, is noted by the veterinarian or Assistant Secretary at their regular inspection visits. Thirty such inspections were made during the past year.

The superintendent is required to report the absence of any communicable disease by mail weekly. The occurrence of sore throat or skin eruptions among any of the employees or their families is reportable direct by telephone to the Secretary or Assistant Secretary.

An index of the cleanliness of Certified Milk may be had by observing the report of the bacterial counts made by our bacteriologist; twenty-seven counts were made during the year at semi-monthly or weekly intervals. Of this number, eight counts will be found under 4,000, nineteen below or better than the 10,000 standard, and five slightly above, and three counts only were high. The latter were carefully investigated and were probably due to the inefficient cleansing of a new and somewhat complicated bottling machine.

Refrigeration: An addition to the ice-house was made last year, nearly doubling the storage capacity. The milk is cooled to 35° F. within fifteen minutes of milking by the passing of water and brine through the cooler. One frequently sees the bottom four or five tubes of the cooler coated with iced milk. The bacteriologist reports the temperature when making his counts. These records reveal the milk to vary between 38° and

52°, with an average for the twenty-seven samples of 43° plus. The milk, after bottling, is iced except in winter weather. Thermos boxes have been provided by the distributor where the milk reached the consumers several hours before it could be used.

Sealing: Last August a change in the sealing was attempted, the metallic cap of the Crown Cork & Seal Company taking the place of the former cap-disk and paper cover. The chief advantage of this method of sealing was the doing away with the necessity of putting on the cap-disk by the man in the bottling room. A practical test, however, extending over a period of several weeks, soon demonstrated that while this method of sealing might be more hygienically perfect than the other, still it was not without serious disadvantages. It was found that the metallic caps did not grip the bottle securely. A special bottle had to be made with a smaller neck, making it more difficult to clean with the revolving brushes. The machine used in capping was ponderous and liable to chip off small pieces, and several complaints were soon received of glass being found in the milk. It has been decided, therefore, that it would be safer to go back to the former method of sealing.

Three chemical examinations were made during the year by our chemist, H. D. Haskins. These reports reveal a milk well within the requirements of the standards of the Commission. A search for preservatives is always included in these examinations.

The Secretary and Assistant Secretary, delegated to attend the annual meeting of the American Association of Medical Milk Commissions held in Louisville last June, report a profitable and enthusiastic meeting. A uniform standard or working method for all Certified Milk Commissions was formally adopted at this meeting.

February 1, the Belle Vernon-Mapes Dairy Company became the distributor of all Walker-Gordon products, including Certified Milk, on the East Side.

The demand for Certified Milk has increased considerably in the past year, about one hundred quarts per day being produced over that of last year, representing a growth in the demand of about twenty per cent.

In conclusion, the Commission wish to remind the medical profession of the cordial invitation extended to them by our producer and distributor to visit and inspect the farm at Novelty. A special invitation was extended last spring by the Belle Vernon-Mapes Dairy Company, special cars and a collation being placed at our disposal. About one hundred physicians availed themselves of this opportunity of visiting a model dairy.

Medical Milk Commission of Malden, Massachusetts.

We are now certifying one farm, Ledyard Farm, at North Reading, Massachusetts, whose output is about three hundred quarts a day.

During the cold weather, visits to the farm are made every other week by members of the Commission, and examinations of the milk are made at least once a month as a matter of routine. During the warm weather, visits to the farm are made weekly by members of the Commission, and examinations of the milk also. A veterinary visits the farm monthly throughout the year, and tuberculin-tests of the cows are made twice a year. In cases of emergency, or when the counts run high, visits to the farm and examinations of the milk are made as frequently as seems desirable.

During the past year we have had one period in the late fall when the counts were running over 10,000. At other times they have been around 5,000. As far as we can make out, the particular high count was due to shipping the milk in a warm baggage car, where it was placed next to the steam pipes. At least, as soon as this was remedied the count promptly fell. I mention this as I have never heard a high count similarly accounted for.

ELMER W. BARRON, *Clerk.*

The Medical Milk Commission of Essex County, New Jersey.

The Medical Milk Commission of Essex County, New Jersey, extends greetings to her sister Commissions, and takes pleasure in presenting to this conference the twenty-fourth report of its unique and beneficent labors.

The Essex County Commission is now in the twenty-second

year of its existence, and both it and the Fairfield Dairy Company, with whom it holds a contract, have shown a steady growth. The Fairfield Dairy Company announces its past year to have been the most successful so far. The present output of the Fairfield Dairy is 6,500 quarts of milk daily, of which 2,847 quarts are certified. To meet a growing demand, the Fairfield Dairy Company during the past year has been delivering Certified Milk in pint containers. There are 608 cows on the plant, of which 572 are milking, and the dairy employs 135 men, and maintains thirty-three deliveries in twenty-one cities and townships, including Arlington, Kearny, East Newark, and Harrison (in Hudson County), and Paterson (in Passaic County).

To accommodate its patrons, the Fairfield Dairy Company has for a number of years, beginning May 21 and continuing through the summer months, delivered Certified Milk along the Jersey shore from Long Branch to Spring Lake. Fairfield Dairy Certified Milk sells for fifteen cents a quart and ten cents a pint.

Perhaps the most important single advance in the cause of pure milk during the past year was the adoption of what was known as Senate Bill No. 181. This was an amendment to the already existing Certified Milk act, enlarging the powers of the State Board of Health in the enforcement of the provisions of the act and simplifying legal procedure. The amendment passed without change, and received the approval of the governor March 25, 1913. It is felt that the law as it now stands is comprehensive and complete, and that the amendment as adopted adds greatly to the strength of the original bill. The amendment as adopted follows:

"An Act to amend the title of an act entitled, 'An act providing for the incorporation of Medical Milk Commissions, and the certification of milk produced under their supervision,' approved April 21, 1909, by adding to such title the words, 'and regulating the sale of milk as Certified Milk,' and to amend the body of said act.

"Be it enacted by the Senate and General Assembly of the State of New Jersey:

"1. The title of the act of which this act is amendatory be and the same hereby is amended so that it shall read as follows:

'An act providing for the incorporation of Medical Milk Commissions, and the certification of milk produced under their supervision, and regulating the sale of milk as Certified Milk.'

"2. Section eleven of the act of which this act is amendatory be and the same hereby is amended so that it shall read as follows: '11. No person, firm, or corporation shall sell or exchange, or offer or expose for sale, or exchange as and for Certified Milk, any milk which is not produced in conformity with the methods and regulations prescribed by a Medical Milk Commission incorporated pursuant to the provisions of this act, or organized or incorporated in some other State for the purposes specified in section one hereof, or any milk which does not bear the certification of such Medical Milk Commission, or which is not produced in conformity with the methods and regulations for the production of Certified Milk, from time to time, adopted by the American Association of Medical Milk Commissions, or which is below the standards of purity or quality for Certified Milk as fixed by the American Association of Medical Milk Commissions. Any person, firm, or corporation violating any of the provisions of this act shall be liable to a penalty of twenty-five dollars for the first offense and fifty dollars for the second and each subsequent offense, to be sued for and recovered by and in the name of the Board of Health of the State of New Jersey in an action of debt. For the collection of any judgment recovered by said Board of Health under the provisions of this act, an execution may be issued against the goods, chattels, and body of the defendant without any order of the court. All penalties collected by said Board for violation of this act shall be paid by said Board to the Treasurer of the State of New Jersey.

"3. This act shall take effect immediately."

Acting under the provisions of the Certified Milk law, the New Jersey State Board of Health undertook, through its Division of Creameries and Dairies, an investigation of the various Certified Milks sold and offered for sale in the State. It was soon found that several of the provisions of the Certified Milk law were not being fulfilled, and that some of the milk offered for sale as and for "Certified Milk" was not certified in fact. It was further found that the State Board of Health was nowhere charged with the enforcement of its provisions, and that no penalty appeared to be fixed in the act for violation of the provisions of section nine. This view was sustained by the attorney-general, whose opinion was asked.

A violation of the bill constituted a misdemeanor, and any citizen having knowledge of such violation could go before the grand jury and ask for an indictment of the person violating the act. This procedure is a slow and cumbersome one, and few persons have the inclination or feel like taking the time to follow it up. On the other hand, if the State Board of Health is required by the act to prevent any violation, and a specified fine is stipulated, the method of procedure is a very simple one and it would become the duty of the State Board of Health to enforce it.

Actuated by the sole desire to safeguard the consumers of Certified Milk against any misrepresentation of the product, the New Jersey State Board of Health requested the attorney-general to draw a bill to facilitate its enforcement in a manner which would be effective and cause little delay.

During the past year the Commission, through its Committee on Sanitation, undertook the examination of the employees of the Fairfield Dairy Company, to determine the presence of possible typhoid fever carriers. The bacteriological examinations were made by Dr. R. N. Connolly, bacteriologist of the Newark Board of Health, who kindly consented to co-operate with the Commission in its undertaking. The examinations are not yet fully completed, but of the employees so far examined, three gave a positive Widal reaction. The results thus far obtained have been interesting and instructive.

The employees were examined at first in groups of twelve, later in groups of eight. Of the first twelve examined, one gave a positive Widal reaction; of the second group of eight examined, two gave a positive Widal reaction, but the case that gave a positive Widal on August 27, 1912, was negative on September 7, 1912. Those showing a positive or suspicious Widal reaction were taken from the barns, were given separate sleeping quarters, and isolated from the other men, but were allowed to work in the fields. The privies were disinfected.

At the request of this Commission, the United States Department of Agriculture, through its Dairy Division, has consented to incorporate in the department's Certified Milk bulletin the names of the dairies certified to by each Commission and

the territory covered by the various dairies. It is felt that this information will add greatly to the usefulness of the bulletin, and prove of much practical benefit to those interested in the pure milk movement.

At the request of the Medical Milk Commission of Passaic County, New Jersey, the Fairfield Dairy Company began, on April 14, 1913, the delivery of Certified Milk in Paterson, New Jersey.

Dr. James A. Exton, of Arlington, New Jersey, a member of this Commission, died July 25, 1912, of cerebral apoplexy. We desire to record here our appreciation of Dr. Extons' long and faithful services.

The vacancy caused by the death of Dr. Exton was filled December 20, 1912, by the election of Dr. George H. Cobb, of South Orange. FLOY MCEWEN, M.D., *Secretary.*

Milk Commission of the Medical Society of the County of Kings, Brooklyn, New York.

The Milk Commission of the Medical Society of the County of Kings, State of New York, is glad to report a year of success and expansion.

Ten years ago the first twelve quarts of Certified Milk were sold in Brooklyn under our certification. During 1912, 1,874,551 quarts were sold, and at the present writing the sales amount to almost 200,000 quarts a month. This is an increase of fifty per cent over the past year. This milk is supplied by ten farms, three new farms having been added during the year, one discontinued, and another transferred to the New York Milk Commission. This supply is distributed by thirteen dealers. These farms are visited regularly once a month by our expert bacteriologist, and oftener if occasion arises, and in addition each farm has been visited at least once by a member of the Milk Commission.

Seven hundred and eighty-one chemical and bacteriologic examinations have been made, with the following average findings:

Butter-fat, 4.5%; highest farm average, 5.4%; lowest farm average, 4.2%; bacterial count, 4,100 per c. c. for the entire year.

Quoting from our annual report to the County Society, the following may be of interest:

"Important improvements have been made in the equipment of these farms during the year. One producer has enlarged his dairy buildings, constructed a new concrete sterilizer, and installed a new acetylene light plant. A new private electric plant has been added to another place. In still another, electric power, a new, all-enclosed aerator, a well two hundred and twenty-one feet deep, and a drainage system have been put in. At other farms large, new boilers, drainage systems, and laundry machinery have been added. Such expensive improvements would not have been made had not the belief in the future of Certified Milk been a strong one in the minds of the milk producers.

"One of our farms secured the highest score and the gold medal at the New York State Fair against many competitors in the class.

"Interest attaches to the fact that a quantity of our Certified Milk is shipped weekly to Panama, where it used, even for infant food, with most satisfactory results when it is two weeks or more old.

"Inspections of milk have been made upon its arrival at various railroad terminals to see if the proper amount of ice was being used. The capping and dating system introduced last year has worked well. Lectures and talks on the subject of clean milk have been given in many different places during the year, often illustrated by lantern slides.

Our Commission has held one conference with representatives of the various concerns which handle Certified Milk, to consider the milk situation as a whole, and especially to discuss methods for furthering the work. In these and other ways we have endeavored to promote the cause of pure milk whenever and wherever it was possible."

The Commission decided as a check upon possible means of error to have chemical and bacteriological examinations made by an independent bacteriologist for a period of a week on all of our work. It was of striking interest to compare the results with those of our own bacteriologist, so closely did they average.

The Commission, believing in its duty as an educator, and in the good results of publicity, has published an annual report in

the shape of a pamphlet entitled "Certified Milk," which has been sent to every physician in Brooklyn, and which the dealers have been invited to distribute as they wish. This contains our report, a word to consumers, standards and working methods, etc., and should greatly aid in the propaganda of Certified Milk in Brooklyn. ROGER DURHAM, *Secretary.*

The Saint Louis Pure Milk Commission.

The Saint Louis Pure Milk Commission was organized in February, 1904; a committee of twenty-seven, representing the leading departments of philanthropic effort in Saint Louis, filed papers for the incorporation of the Saint Louis Pure Milk Commission. In June of that year a laboratory was fully equipped and formally dedicated. The Commission now distributes, through fifteen milk stations, over half a million bottles of pure milk, modified to meet the needs of each individual case. A large percentage of this is given absolutely free; for the other portion the Milk Commission receives less than one half the cost of production. Since the incorporation of the Commission, it has distributed a total of 4,600,462 bottles. The milk used for this work, while not certified, is thoroughly inspected, and is the equal of Certified Milk, as the dairy is under the same restriction as those producing Certified Milk. The bacterial average of this dairy for the past year was 12,300 per c. c.

The Commission now certifies to the product of four farms with three hundred and twenty cows. Inspections are made each month, or oftener, by the superintendent of the Commission, and these are supplemented by inspections by members of the Certification Committee. Weekly chemical and bacteriological analyses are made, and I am pleased to state that in the past year the lowest yearly average has been made since the incorporation of the Commission.

Although there have been some minor difficulties with the distributors, the Commission is very glad to report the cordial co-operation of the dairymen in every way, even where the improvements meant great expense.

The first year the Commission certified to the product of one farm—20,400 quarts were produced and sold; in the year just closed 756,953 quarts were produced and sold.

The Commission also takes pride in calling attention to the following chart, showing the decrease in the death rate of infants in the city, which the Commission feels is largely due to the effort made in supplying a proper substitute for the mothers' milk:

Deaths of Infants Under One Year During Summer Months, June to September.

1906.	1907.	1908.	1909.	1910.	1911.	1912.
810	778	737	713	743	699	552

Yearly Infant Mortality Rate per 1,000 Births.

1906.	1907.	1908.	1909.	1910.	1911.	1912.
134.5	117.8	106.6	113.3	112.1	106.1	97.4

H. E. MORTLAND, *Secretary.*

PROVISIONS OF STATE LAWS AND REGULATIONS AIMED AT THE PREVENTION AND SPREAD OF COMMUNICABLE DISEASES THROUGH MILK.

J. W. Kerr, M.D.

Milk has long been recognized by sanitarians as a carrier of communicable diseases. Herein lies its greatest danger to the community. It is of interest, therefore, to inquire into the extent and character of legislation aimed at the prevention of the spread of communicable diseases in this manner.

Probably the first official action in this respect taken in America was due to that highly fatal infection known as "milk sickness." Early in the last century several of the States offered liberal rewards for the discovery of the cause of the disease, and in 1821 Tennessee passed a law "To prevent animals from eating an unknown vegetable, thereby imparting to their milk and flesh qualities highly deleterious."

Many years passed without further milk legislation of any character, and, so far as known, the first law specifically in-

tended to prevent the spread of communicable diseases was not enacted until 1873, when Michigan took such action in order to prevent the spread of the diseases with which cows themselves might be afflicted. A few years later laws were enacted here and there to prevent the transportation and sale of milk contaminated by "The emanations, exhalations, or discharges of any person sick with communicable disease."

The milk statutes existing prior to 1890 were not intended to control bacterial contamination, but in a few jurisdictions laws were soon thereafter passed to prevent the sale of "diseased, corrupted, or unwholesome milk," and in the State of New York, by an act of 1894, tuberculosis among cattle was investigated and authority was granted for the destruction of infected cows.

A large body of laws is now contained in the statutes of the several States relating to milk supplies. A number of them have for their specific purpose the prevention of communicable diseases. While making an analysis of all State laws relating to the control of communicable diseases, these specific statutes relating to the prevention of the spread of communicable diseases through milk have been brought together, and a brief analysis of them will be here presented.

Before doing so, however, it is necessary to state that the responsibility for the safety of municipal milk supplies devolves primarily on local authorities. Their powers in this request have been delegated to them by their respective States, and as a result a great mass of ordinances have been enacted and resorted to by municipal authorities.

Reporting of Diseases on Dairy Premises.

By law or regulations in a number of States it is specifically required that persons in charge of dairies or dairy farms shall report cases of communicable diseases to the proper health authorities. This provision is mentioned in the laws of Idaho and Ohio, and in regulations of the State Boards of Health of Illinois, Kentucky, and New Jersey. In Wyoming a law requires physicians to make like reports.

In Pennsylvania, cases of typhoid fever must be reported immediately to the State Health Department, and a regulation of that department requires that cases of typhoid fever, diphtheria, and scarlet fever must be reported by telephone or telegraph by the local health officer to the county medical inspector, who represents the State health authorities. In New Jersey the cases must be reported within twelve hours, and in Idaho within twenty-four hours.

While in some States—as Idaho, Illinois, Kentucky, Louisiana, Montana, Nebraska, and Ohio—any communicable disease is apparently contemplated by the provisions of the laws or regulations, in others the diseases against which precautions must be taken to prevent their spread through milk are specified. In Indiana, Utah, and Wisconsin these are any quarantinable disease, and especially typhoid fever; in Washington, any disease requiring quarantine or isolation; in Pennsylvania, smallpox, diphtheria, scarlet fever, cerebro spinal meningitis, and typhoid fever; in Ohio, diphtheria, typhoid fever, dysentery, and tuberculosis; in North Dakota, smallpox, diphtheria, scarlet fever, measles, and whooping cough; in Iowa, cholera, plague, leprosy, smallpox, diphtheria, scarlet fever, cerebro spinal meningitis, and poliomyelitis; in Oklahoma, cholera, smallpox, diphtheria, scarlet fever, cerebro spinal meningitis, measles, typhoid fever, and tuberculosis; in Vermont, cholera, yellow fever, typhus fever, smallpox, varioloid, diphtheria, scarlet fever, and cerebro spinal meningitis; in California, cholera, typhus fever, plague, anthrax, glanders, leprosy, dysentery, trachoma, tetanus, diphtheria, scarlet fever, cerebro spinal meningitis, typhoid fever, and whooping cough; in the District of Columbia, cholera, typhus fever, yellow fever, anthrax, erysipelas, smallpox, diphtheria, scarlet fever, typhoid fever, and tuberculosis; in practically all of the States special mention being made of typhoid fever.

Provisions Respecting Employment in Dairies.

In a number of State laws or regulations, provisions are contained relating to employment in dairies and on dairy farms. This provision in the District of Columbia and Minnesota speci-

fies that no person suffering from any dangerous contagious disease is to work or assist in or about any dairy farm. In Texas it is provided that no person suffering from any reportable disease, or residing in a house in which exists a case of smallpox, diphtheria, scarlet fever, or typhoid fever, shall work in any dairy unless the local health officer gives permission.

In Arizona, no person affected with a communicable disease, or recently having come in contact with a patient, is to handle milk or milk-cans.

In New Jersey, no person with diphtheria, scarlet fever, typhoid fever, or tuberculosis is to be employed in or allowed to enter any dairy.

In Washington, it is provided that no person with pulmonary tuberculosis, or proved to be a typhoid or diphtheria carrier, shall be allowed to work at any occupation involving the handling of milk.

In Arizona, Illinois, Kentucky, Louisiana, Minnesota, Nebraska, and Oklahoma, it is provided that no person who handles or milks cows, or in any way comes in contact with milk or milk receptacles, is to have communication with any person suffering from a communicable disease.

In a considerable number of States, either by law or regulation, the employment of persons suffering from communicable diseases is forbidden in any place where food is sold, produced, prepared, stored, distributed, or transported, these provisions applying also to dairies.

Provisions Relating to Milk Containers.

In various States it is provided that no milk bottles or other containers are to be taken from quarantined premises, unless the permission of the health officer has been obtained or other specified precautions complied with. In other States, the use of containers that have been handled by persons with communicable diseases is prohibited until after sterilization, and if taken into the house they may even be required to be destroyed.

In Arizona, during epidemics of scarlet fever, diphtheria, typhoid fever, or measles, the leaving of bottles or other con-

tainers with milk at consumers' houses is required to be discontinued. In many other States it is provided that milk containers shall be kept in a sanitary condition.

Sale of Milk from Infected Houses.

The sale of milk from houses where communicable disease prevails is, by regulation of the State health authorities, forbidden in some States. For instance, in Florida (in cases of diphtheria) and Montana such prohibition is absolute, and in Utah and Wisconsin it is enforced unless complete segregation of the patient is accomplished. In Indiana and Wisconsin, in addition to segregation, the permission of the local health authority is required to be obtained, and in Illinois, Kentucky, Louisiana, Nebraska, and Oklahoma, all danger of contagion must have passed and the permission of the local health authority be obtained. This provision has been embodied in law in Idaho.

In Iowa and Vermont the sale of milk from quarantined premises is forbidden by regulations of the State Board of Health, but if the dairy and farms are situated at a safe distance from the quarantined dwelling, and no person, utensil, or water therefrom comes in contact with the dairy products, the local health authorities may allow the milk to leave the premises. It is stated, however, that under no conditions shall milk exposed to infection be allowed to be removed.

In California a law provides that whenever a case of communicable disease occurs in the house of a milkman, milk dealer, or distributor, no milk shall be sold or distributed by him until the health authorities designate a person to conduct the business and to see that no communication is maintained with the infected house except under official supervision.

In North Dakota a regulation of the State Board of Health prescribes that no milk shall be sold without permission from cows kept on premises where any communicable disease prevails, nor milk handled by or coming in contact with persons who have been exposed to any communicable disease.

In New Jersey the law authorizes the State Board of Health

or any of its officers to prohibit the transportation or sale of milk believed to have been contaminated by "emanations, exhalations, or discharges" of infected persons. In the District of Columbia the health officer is empowered to suspend or revoke the selling license of any dairyman or milk dealer whose milk supply is exposed to infection.

In Pennsylvania the regulations of the State Health Department requires that whenever a local health officer ascertains that milk is marketed from premises in which a communicable disease prevails, he must report the facts to the county medical inspector, who is to determine whether proper precautions have been taken to prevent the transmission of disease and to see that those handling the milk are kept out of the infected premises; if this is not done, the marketing of milk must be discontinued or the live stock transferred to other premises; while in the case of smallpox, the sale of all milk products must be stopped.

In a number of States, including Connecticut, Illinois, Maine, Maryland, Massachusetts, Michigan, New Jersey, New York, Ohio, and Virginia, the specific provisions mentioned in law to prevent the spread of infection through milk are confined to prohibiting the sale of impure milk or milk produced under unsanitary conditions.

The President: "This, then, ends our open meeting. We wish to thank our guests for their courtesy in attending this open meeting. The Association of Medical Milk Commissions will now go into executive session."

Moved that recess of five minutes be taken before the executive session. Carried.

Adjourned to meet in five minutes.

Following is a summary of the transactions of the executive session called by the President:

The Secretary read the resolutions adopted by the Certified Milk Producers' Association requesting that the American

Association of Medical Milk Commissions present standard requirements for Certified Milk production in which there shall be clearly defined the essentials, which shall be enforced by all Commissions, and the non-essentials, which shall be adhered to as nearly as possible. That Certified Milk thus produced in one district shall be accepted in other Certified Milk districts without duplication of the work of the Milk Commission. That a Council Board be appointed to consider differences arising amongst Commissions themselves, or between Commissions and producers.

After much discussion, a motion was made by Dr. Ludlum that the matter be referred back to the Council with instructions that they report official recommendations to this body next year, reporting also to the Certified Milk Producers' Association of America. Motion was lost.

A motion was then made by Dr. Ludlum that the recommendation of the Council be adopted. It is as follows:

"The Council recommends to the Association that the communication received from the Producers' Association as to their action at Great Barrington, Massachusetts, June 11, 1913, be referred back to the Council with power to act, and that Council advises the Producers' Association of that action."

After much discussion by the members and explanation by the Secretary, this motion was carried.

The question of the legality of the election of officers which occurred on the previous day was then taken up by the Association. Dr. McCleave raised a point of order that one Commission had voted more members than is permissible by the Constitution.

After much discussion, in which Doctors Ludlum, McCleave, and Bell took part, the President ruled that the election was illegal. It was also ruled that the business transacted on the previous evening was illegal.

The Association then took up the report of the Council, considering and approving each recommendation item by item.

The following officers were elected: Dr. Kerr, President; Dr. Geier, Secretary; Dr. Graf, Assistant Secretary; Dr. Sedgwick, Treasurer; Dr. Ludlum, as member of the Council for a five-year term; Dr. Smith, as member of the Council for a two-year term.

The following recommendation of the Council was also acted upon:

"The Council further recommends that the Secretary of Agriculture be requested to make a survey of all dairies and products under the supervision of the Milk Commissions, for the purpose of determining the efficiency of the supervision and the results thereof. This same to be used as basis of a report to the meeting of this Association next year."

Adopted .

After some further discussion, the Association adjourned to meet in Rochester in 1914.

Eighth Annual Meeting

OF THE

AMERICAN ASSOCIATION OF MEDICAL MILK COMMISSIONS

HOTEL SENECA, ROCHESTER, N. Y.

June 19 and 20, 1914

EXECUTIVE OFFICERS 1914-15.

JOHN W. KERR, M. D., President.
U. S. PUBLIC HEALTH SERVICE, WASHINGTON, D. C.

OTTO P. GEIER, M. D., Secretary.
ORTIZ BLDG., CINCINNATI, O.

WM. J. GRAF, M. D., Ass't Secretary.
ORTIZ BLDG., CINCINNATI, O.

J. P. SEDGWICK, M. D., Treasurer.
NEW SYNDICATE BLDG., MINNEAPOLIS, MINN.

COUNCIL.

J. R. WILLIAMS, M. D., CHAIRMAN,
ROCHESTER, N. Y., 1914.

RICHARD M. SMITH, M. D., BOSTON, MASS., 1915.

J. J. THOMAS, M. D., CLEVELAND, O., 1916.

T. C. MCCLEAVE, M. D., BERKELEY, CAL., 1917.

WALTER D. LUDLUM, M. D., BROOKLYN, N. Y., 1918.

JOHN W. KERR, M. D., WASHINGTON, D. C.,

J. P. SEDGWICK, M. D., MINNEAPOLIS, MINN.

OTTO P. GEIER, M. D., Secretary.
CINCINNATI, O.

American Association of Medical Milk Commissions.

FIRST SESSION.

Friday Morning, June 19, 1914.

The session was called to order by President John W. Kerr, Assistant Surgeon-General of the United States Public Health Service, of Washington, D. C., at 10:20 o'clock. Dr. Kerr said:

"Ladies and Gentlemen: It becomes my duty as President to call this, the eighth annual meeting of the American Association of Medical Milk Commissions, to order. In doing so I wish to express to the Association my great appreciation of the honor done me in my election as President and designating me as delegate on behalf of the Association to the English-speaking Conference on Infant Mortality, in London. The work we have before us will be time-consuming. I shall not, therefore, take any of your time to make further remarks other than to say that the object of the Association, as you all know, is to forward the ideals of dairy hygiene and to prevent mortality. Later in the day I shall have a paper to present to the Association.

"I shall now call on Dr. J. R. Williams, of Rochester, who has some announcements to make; I shall also call upon Dr. Williams to present to the Association the mayor of Rochester, the Hon. Hiram H. Edgerton, in whose city we are guests at this time."

Dr. Williams introduced the mayor of Rochester to the Association as follows:

"Mr. President, Ladies, and Gentlemen of the Association,—On behalf of the American Association of Medical Milk

Commissions and the physicians of Rochester generally, I am very glad to welcome you here. We have been looking forward for some time with great interest to your coming, and if you do not have a good time it will not be our fault. . . .

"I take pleasure in presenting to you the mayor of this city, Mr. H. H. Edgerton, who has been mayor so long that it almost antedates my memory, and who has been kept in office because of the excellent service he has rendered us."

Mayor Edgerton: "Mr. President, Ladies, and Gentlemen,—Something has happened this morning that I regret exceedingly.

"It has been my privilege for quite a number of years to stand before conventions of this kind and extend to them the greetings of the citizens of Rochester. This is a duty which seems to have fallen upon the mayor here, and which has become quite a large part of his duties. It is always a pleasure to welcome guests to our city, and this morning it is especially so. We expect to obtain from you while you are here a good deal that will be of benefit to us. . . .

"Some of the smaller conventions are a great deal more important than some of the large ones. Large conventions bring many people and much noise, and they go away, of course, most of them pleased and satisfied with Rochester. We have one of the most beautiful cities in the whole country; I want you to see it; I want you to feel that you are welcome here, and I am certain that wherever you go you will find a hearty welcome. Again I will bid you welcome, and so far as it is possible for me to do so, I extend to you the freedom of our city."

President Kerr: "I am sure we all appreciate the remarks of the mayor, and that we shall take advantage of the hospitality which he has extended to us. We are very glad to have those in authority attend our meetings and learn our ideals and see what problems we are trying to solve as, in the last analysis, they have a great deal to do with the handling of these matters. I think one of the most hopeful signs of the

times is the great interest taken by the mayors of cities and the governors of States in public health matters, and I feel sure that I voice the sentiments of all in thanking the mayor for his presence with us."

The next in order was the roll call of the Commissions and members. The Secretary suggested that instead of calling the roll, he read the registration. The President stated that he would ask for the roll call at a later hour, and asked the Secretary if any communications had been received. The Secretary reported that there were no communications.

President: "I shall next call for the report of the Council. Only one Council meeting has been held since the last Association meeting in Minneapolis. Dr. Williams will read the report of the council."

Dr. Williams: "Owing to a slight impairment in my speech, due to difficulty in reading the handwriting, I am going to ask the Secretary to read this."

Secretary Otto P. Geier: "Dr. Williams has an impairment in his throat and the Secretary has it in his handwriting, both due to the late hour last night." He then read as follows:

REPORT OF THE COUNCIL.

Meeting Held June 18, 1914, at the Hotel Seneca, Rochester, New York, 9 P. M.

Present: Drs. Kerr, Williams, Ludlum, Thomas, McCleave, and Geier. Dr. Williams presiding.

Dr. Ludlum presented the name of Dr. Harris Moak for individual membership in the Association.

It was decided by Council to hold the next meeting of the Association in San Francisco, but that the invitations of the Pacific Division of the American Association for the Advancement of Science, the Milk Commissions of California, and the Panama-Pacific International Exposition be accepted, subject to contingencies which would justify a change in the place of meeting.

Council recommended to the Association that a "Milk Contest" be held in connection with the next meeting.

The following names were offered by Council for the officers of the Association for the coming year:

For President—Dr. T. C. McCleave, of Oakland, California.

For Secretary—Dr. Otto P. Geier, of Cincinnati, Ohio.

For Assistant Secretary—Dr. William J. Graf, of Cincinnati, Ohio.

For Treasurer—Dr. J. P. Sedgwick, of Minneapolis, Minnesota.

For Member of Council for Five Years—Dr. Walter Haines, of Chicago, Illinois.

For Member of Council to serve the unexpired term of Dr. McCleave—Dr. John R. Williams, of Rochester, New York.

Council desires to present to the Association an amendment to the Constitution, by striking out the second paragraph of Article 6, Section 3, of the Constitution and replacing it by these words, "Council shall annually elect its Chairman."

Council also recommended to the Association an amendment to the By-laws, Chapter 5, by striking out the four committees therein named and substituting the following: "Committee on Working Methods and Standards," "Committee on Milk Economics," "Committee on Milk Charities," and "Committee on Milk Contests."

It was moved, seconded, and carried that the dues of Commissions and individual members for the coming year shall be $15 and $3, respectively.

Dr. Kerr appointed Dr. Thomas and Dr. Coit as a committee of two to audit the report of the Treasurer.

Dr. Geier presented a letter from Mr. J. C. Dornes, a producer of milk in Denver, Colorado. Mr. Dornes came to Cincinnati early in the winter for information on the production of Certified Milk. He visited several certified plants in Cincinnati and elsewhere, and when he returned to Denver, erected a barn and milk-house of the very highest type. The cattle, all thoroughbred Guernseys, were tested by the State veterinarian. He interested Dr. J. Amesse, a children's specialist in Denver, and asked him to present the matter of an appointment of a Milk Commission to the Medical Society. Dr. Amesse agreed

to do this, and, to his surprise, the Medical Society would not consider it. Mr. Dornes appealed to Dr. Geier, and Dr. Geier through correspondence has attempted to interest a number of physicians in Denver.

After the reading of the letter from Mr. Dornes, Dr. Kerr moved that a committee be appointed to confer with such members of the Denver Medical Society who might attend the meeting of the American Medical Association at Atlantic City, and further that the Secretary be instructed to communicate with the officers of the Denver Medical Society.

Dr. McCleave and Dr. Thomas were appointed a committee of two to confer with the Denver members at Atlantic City.

President: "What is the pleasure of the Association in respect to this report of the Council?"

Moved and seconded that it be accepted and taken up for action. Carried.

The following were nominated for membership: Dr. V. K. Jindra, of Alberta, Canada, and Dr. Harris Moak, of Brooklyn, New York.

Moved that the recommendations of the Council be concurred in. Seconded and carried.

Dr. Van Derslice: "Is this a nomination or an election?"

President: "I understand that it is a virtual acceptance of them."

Dr. Van Derslice: "What is the rule of the Chair? Is it an election?"

President: "I would say it was an election of members, and that we would subsequently take up the matter again."

Dr. Henry L. Coit, of Newark, New Jersey: "It seems to me the custom of this Association in the past has been to get these nominations and then, in a later session, to determine who are members by those who have paid their dues. There

would be no way of determining in this miscellaneous assembly of guests and visitors. I should like to have my mind cleared on the subject."

Secretary Geier: "I think the point is well taken."

Member: "That will apply equally to any action that is taken here. We want to determine what our standard is before we vote on this. If our vote now is simply informal, none of our action taken will be strictly legal. We had better determine whether this is an executive session or not."

Member: "I think it ought to be called an executive session. If it is an executive session it must transact the business of one."

President: "Inasmuch as the Council has recommended these individuals for membership, there being no contrary vote, and it now being time to settle whether we should transact any other business except the hearing of reports of Commissions and scientific papers, I feel that we should act on this report. The amendment of the By-laws and Constitution cannot be acted upon at this session. If there is no objecton, we will take up the next item."

Secretary Geier: "The Council recommends that the next meeting of this Association be held in San Francisco, California, in 1915, the exact date to be determined later, during the period of the Medical Congress, extending over two weeks, to be arranged for in connection with the Exposition."

Dr. T. C. McCleave, Berkeley, California: "In reference to this invitation to California, it might be interesting if I should say a little about what we are planning to do out there. The Exposition, of course, you have all read about. The plans in connection with it are sanitary and hygienic—more so than has been the case in any other Exposition—so it will be of peculiar interest to the medical profession. Then, the medical societies of the Coast, in connection with the Exposition, are

planning for a two weeks' Congress of Medicine. We hope you will accept this invitation to come."

President: "What action shall we take?"

It was moved, seconded, and unanimously voted to accept the invitation.

Secretary Geier: "The further recommendation is that the Council hold a Milk Conference in connection with the next meeting."

A motion was made to this effect, which was seconded, and carried unanimously.

Secretary Geier: "The next in order is the election of officers, which comes properly this afternoon, and I move that further work be dispensed with at this time."

Member: "I have just been informed of the death of Dr. Merrill, of Chicago, one of the nominees, and the Council recommends in her place Dr. Haines, of Chicago."

President: "Inasmuch as no action will be taken on the nominations by the Council until a later period, we will pass over the substitution."

Secretary: "In regard to the amendments to the Constitution, in the second paragraph, Article VI, Section 3, of the Constitution says, 'Council shall annually elect its chairman,' substitutes the wording, 'At each annual meeting,' etc."

President: "On behalf of the stenographer, I wish to ask that each speaker hereafter announce his name."

Dr. Walter D. Ludlum, of Brooklyn, New York: "It is important in the By-laws, and my impression is that all that is to be done is to read it now, because it must be presented in an open meeting and sent to the next meeting, and cannot be acted upon at all until a year from now."

President: "If there is no objection, we will accept this recommendation as having been presented to the Society.

The next item is in regard to substitutions of committees and changing names of committees."

Moved, seconded, and carried that the annual dues of Commissions be $3 and $15 respectively, the same as have prevailed for a number of years.

The next in order was the appointment of a committee of two to audit the report of the Treasurer.

STANDING COMMITTEES.

MEDICAL EXAMINATION OF EMPLOYEES.

Dr. H. L. Coit, Chairman, Newark, New Jersey.

I have no written report because of the impossibility of getting the members of my committee together—one lives in San Francisco and one in Louisville, Kentucky. Since this Association has adopted a code of methods and standards which are to prevail and which is to influence all the Commissions in the details of their work, it will now only be necessary for the four committees to consider suggestions for checking up our methods and standards.

CHEMICAL STANDARDS.

Dr. L. L. Van Slyke, Chairman, Geneva, New York.

Dr. L. L. Van Slyke was not present, so no report was made.

BACTERIOLOGICAL STANDARDS.

Dr. M. J. Rosenau, Chairman, Harvard University, Cambridge, Massachusetts.

No report.

VETERINARY INSPECTION AND PROTECTION AGAINST TUBERCULOSIS.

Dr. Samuel McC. Hamill, Chairman, Philadelphia, Pennsylvania.

No report.

STATISTICS ON MILK CHARITIES.

Dr. John W. Kerr, Chairman, United States Public Health Service, Washington, D. C.

I have had no opportunity to confer with my committee sufficiently to make any report this year. All this work has been done in previous years by correspondence, and the preparing for other meetings, the meeting abroad last year, and this year the special work and the further work of studies of milk charities have been deferred.

In regard to the Committee on

WORKING METHODS AND STANDARDS,

of which I am also chairman, I would say that the committee has no report. I feel that no report should be made. It has not been very long since a complete revision of the methods and standards was prepared and published, and is being used by Commissions in different parts of the country, and I think now they will be able by experience to tell wherein there are faults and wherein the methods and standards should be revised. That is one of the advantages of this annual meeting—to bring matters of this kind before the conference and determine when changes are necessary.

MILK ECONOMICS.

Dr. John R. Williams, Chairman, Rochester, New York.

I have no report to make.

President: "I will now ask the Secretary to call the names of the Commissions, and as nearly as possible in alphabetical order."

REPORTS OF COMMISSIONS.

ALAMEDA, CALIFORNIA.

T. C. McCleave, M.D., Berkeley, California.

I will say for the Alameda and San Francisco Commissions that we have no particular change to report. The Alameda Commission certifies five dairies, sending into Alameda County

3,500 quarts of milk daily. San Francisco certifies three dairies. The work is on a good basis. Our expert work is done entirely under the supervision of the Veterinary Department of the University of California. We have always employed as experts members of that department, but the charge we arrange with the university itself. The department assumes the responsibility of the expert work, the bacteriological and the medical work, etc. This is very satisfactory, because no higher grade of work could possibly be secured, and it gives all the same class of work. The members of the Commission, of course, doing the usual inspection work are supposed to be desirable, too. Our dairies are visited every two weeks, and examinations are made every two weeks. During the year we had to drop two dairies, they not being up to the standards required; and we have taken on two new ones. The total amount of milk certified in the neighborhood of San Francisco and Alameda, under the jurisdiction of these Commissions, is about 7,000 quarts daily.

THE MILK COMMISSION OF THE MEDICAL SOCIETY OF THE COUNTY OF KINGS, STATE OF NEW YORK.

Alfred Bell, M.D., Chairman.

This Milk Commission would again report another very successful year's work. Though each succeeding year brings its added responsibilities, there is the constant desire to make "our better best." Thirteen meetings of the Milk Commission have been held during the year, and were remarkably well attended by the members. When we made our last annual report and enumerated the many changes on the certified farms during the year, it did not seem possible that so many and better improvements could be made this year.

About the first of April we had to discontinue the certification of one of the farms that had been on our list for several years, for the reason that we could not secure results that came within our standards. We did not discontinue, however, until every effort to aid and assist this plant in keeping up to the require-

ments proved of no avail. Two other large and entirely new plants of the most modern and sanitary construction have been added to our list during the year. One of these began work about April 1, when we discontinued the aforementioned plant, and the other was accepted during October.

Two of our plants have been equipped with apparatus so that the stables may be cleaned by machinery. The apparatus consists of an endless chain to which are fastened several lug-plates. This chain is operated by a small gasoline engine, and the manure is loaded directly into the wagon, which is placed at one end of the stable. Each half of a seventy-cow stable can be cleaned in less than two minutes. This is an enormous labor-saving device. It is the first thing of the sort that we know of in this country, and was installed under the advice of our expert, Dr. Moak.

Two more of our farms have installed private storage-battery electric light plants. Without going into detail, we would say that every one of our farms have made extensive changes during the past year.

Three of our farms have installed milking machines, one of which has now been in operation for over eight months and thus far has given especially good results. Our laboratory has been giving this subject a special study, and the results are of interest, especially the bacterial counts, which we will rehearse as follows:

Month.	Number of Examinations.	Average Bacteria.
October, 1913	14	5997
November, 1913	27	2837
December, 1913	18	1515
January, 1914	33	2446
February, 1914	20	1830
March, 1914	22	3794
April, 1914	23	4067
May, 1914	25	2620

These are counts as the milk is delivered in the city. We shall continue giving this subject considerable study for the reason that several of our farms are anxious to install now that the results seem to justify the same. No hand touches the milk produced with the milking machine, and it practically eliminates

even the remote possibility of any specific disease germs getting into the milk.

However, to throw every possible safeguard around the Certified Milk that we can afford, the Milk Commission has arranged to have physicians who are located near each one of our farms visit these farms at least once a month and make inquiry regarding the health of all employees who have anything to do with the production or handling of the milk. These physicians report to and receive their retainer from the Milk Commission. This service is in addition to our regular monthly inspections by our expert.

PHYSICIAN'S REPORT.

FOR THE MILK COMMISSION:

REPORT OF VISIT TO.....FARM, ON THE FOLLOWING DATE.....

To the best of your knowledge upon inquiry, and upon physical examination when you deem it necessary, are any of the employees at this farm suffering with any disease likely to be conveyed by milk?.....

Upon inquiry, have any of the employees been exposed at home or elsewhere to any disease which might be borne by milk?.....

Inquiry should especially be made for cases of "sore throat," as this is so often the initial symptom of more serious trouble, such as Scarlet Fever, Diphtheria, and Septic Sore Throat. Other diseases which may be conveyed by milk are Typhoid Fever and Tuberculosis. Should any case occur which you regard as dangerous to the milk promptly use your best endeavors to isolate such case or remove it from the farm and notify the Commission by wire.

Remarks:.....

Dated..... Signed,.....M. D.

Our Milk Commission authorized Dr. Moak, and he has already finished the work of immunizing the employees on our various farms against typhoid fever. This was done at the expense of the Milk Commission.

MILK COMMISSION
OF
MEDICAL SOCIETY OF THE COUNTY OF KINGS
BROOKLYN, NEW YORK.

This is to certify that.....
while employed at.....farm located at.....was immunized against Typhoid Fever, and that such immunization was completed.....19...
.....Vaccine was used.

Vaccine administered by.....M. D.
For the Commission.

During the year several of the farms have been personally visited by members of the Commission. One hundred farm inspections have been made by our inspector and reported.

One part of our work that has come in for considerable inquiry during the year is the question of bottling the milk warm, immediately after milking, and cooling it in the bottles. We have had correspondence and inquiries regarding this process from a number of men in the United States, and a few inquiries from Canada. This method has been mentioned in one of our earlier annual reports, but after a number of years of use and a number of inquiries regarding the process, it might with propriety be reviewed as follows: Our farms use galvanized iron pans made to almost the depth of a milk bottle. These pans hold about one hundred and twenty bottles each, and they stand on a table made of galvanized iron piping. These pans are about one half full of water, in which there is plenty of floating ice. The bottles of warm milk are then placed immediately therein. It takes but a little while to fill the pan with bottles, and that brings the ice and water up to the top of the pan and bottles. These bottles thus filled, say this evening, stand in these pans over night; then, to-morrow morning they are taken out and put into the regular twelve-quart wooden shipping boxes and covered with cracked ice. The pans thus empty are ready again for the morning milking. The morning milk then stands in these pans until between ten and eleven o'clock, when they are taken out and put into shipping boxes, and the whole amount taken to the train for shipment. To bottle milk warm and cool it in the bottle and have it arrive at the consumers' house in good condition is the best proof of two great points: first, that the cows furnishing such milk did not have any strong or unsavory food too soon before milking; second, that the stables where it was milked and the room in which it was handled were free from objectionable odors. This method is to be recommended only for high-grade milks, and for such milk it has long since ceased to be an experiment with us.

We have made one hundred and seventy-two bacterial examinations of other special grades of milk on the market, in

order to know how our own efforts were comparing with other endeavors, and we want to take this occasion to state that there is no other grade of milk on the market that yet compares in sanitary quality with the Certified Milk.

It has been necessary for us to again do some bacterial testing at the farms, and seventy-four such counts were made. This was the means of detecting trouble which could not be located by naked-eye inspection of the plants.

For a number of years we have sent monthly to all the members of our county society a small, three-by-five-inch card convenient for physicians to carry or file in a card index. This card gives the names of the various dealers who distribute Certified Milk:

Milk Commission of the Medical Society of the County of Kings. Brooklyn, New York.

ALFRED BELL, M. D., Chairman, 37 Linden Street.
ROGER DURHAM, M. D., Sec'y & Treas., 322 Park Place.
HARRIS MOAK, M. D., Bacteriologist and Chemist, 360 Park Place.

LOUIS C. AGER, M. D. ARCHIBALD D. SMITH, M. D. ELIZABETH A. BRUYN, M. D.
WALTER D. LUDLUM, M. D. FRANCIS B. HART, M. D. ALEXANDER SPINGARN, M. D.

THE FOLLOWING DEALERS HAVE CERTIFIED MILK FOR SALE:

BORDEN'S CONDENSED MILK CO.,
98 Sterling Place and Other Branches.
Telephone, 168 Prospect.
ALEX. CAMPBELL MILK CO., 802 Fulton St. and Branch Stores.
Telephone, 2174 Prospect.
H. S. CHARDAVOYNE,
406 Court St. Tel., 151 Hamilton.
COOKE MILK & CREAM CO.,
294-98 Graham Ave. Tel., 3571 Stagg.
DIAMOND DAIRY CO.,
Carlton Ave. and Pacific St., and Branch Stores. Tel., 2522 Prospect.
EMPIRE STATE DAIRY CO.,
502 Broadway, and Branch Stores.
Tel., 4400 Williamsburgh.
W. M. EVANS, Tel., 1656 Prospect.
32-34-36 Lexington Ave.
HIGH-GROUND DAIRY CO.,
443-453 Madison St., Tel., 4500 Bed
MEADOW BROOK FARM DAIRY,
65 Canal Street, Stapleton, S. I.
Tel., 261 Tompkinsville.
ISAAC W. RUSHMORE CO.,
100 Atlantic Ave. Tel., 2420 Main.
SHEFFIELD FARMS,
Slawson Decker Co., and Branches,
1394 Fulton St. Tel., 6731 Bedford.
R. F. STEVENS MILK CO.,
90-94 Third Ave., and Branch Stores.
Tel., 731 Main.
T. J. TAYLOR MILK CO.,
702 Van Duzer St., Stapleton, S. I.
Tel., 644 Tompvil.
UNION DAIRY CO.,
858 Fulton St. Tel., 4600 Prospect.

The sales of Certified Milk have increased in a most satisfactory manner. We have certified to 2,388,982 quarts of milk in 1913, or 514,432 quarts more than in 1912. During our last complete month (May, 1914) the total sales were 13,401 quarts

more than the total sales for the preceding month (April, 1914), and 36,326 quarts more than in May, 1913.

We are pleased to again state that one of our farms took the highest honors for Certified Milk at the New York State Fair, at Syracuse, in September, 1913.

It is a fairly easy matter to sit down and prepare a set of rules for the production of Certified Milk, but this is as nothing in comparison to the work of carefully putting and keeping those rules in practice. Eternal vigilance is the price of Certified Milk. We have the means and are sparing no expense to have our work and our services of the best.

CHICAGO, ILLINOIS.

J. W. Van Derslice, M.D., Secretary.

I am making a very brief report of the work done by our Commission and the way we do things, and I ask your criticism upon it. I deeply regret that I have to announce that the Chicago Medical Society has lost Dr. Julia Merrill by death within the last two months.

Dr. Van Derslice then exhibited the cards and other printed matter used in recording the various lines of work done by the Chicago Milk Commission; the more important of these had to do with the milk examination, sanitary inspection, medical inspection of employees, tuberculin testing of cattle, milk sales, etc. He also exhibited a copy of a brochure on pure milk, 100,000 copies of which had been printed by the Commission for distributon. This book has been copied by several cities.

Secretary: "I am much impressed with the businesslike methods in which this work is done in Chicago. There is a great lack throughout the country of these desirable matters in handling this subject, and you can see that they have a method, by the report of Dr. Van Derslice.

MILK COMMISSION OF THE ACADEMY OF MEDICINE, CINCINNATI, OHIO.

W. J. Graf, M.D.

The Cincinnati Commission reports progress. We are now certifying to 10,530 gallons of milk per day, which represents over 2½% of the city's milk supply. We have two new farms applying for our certification, one, the Elmendorf Farm of Judge John Haggin, Lexington, Kentucky, probably one of the largest of its kind in the United States. No changes have been made as far as regulations and standards are concerned, except in the bacterial count for Inspected Milk—our standard now is 60,000 the year around. Last April we introduced among our producers a proposition intended primarily to stimulate better work and greater interest among the milkers, etc., on the farms, which provided for a bonus to be given by the Commission to each and every man concerned in the production and handling of the milk on the particular farm whose product showed for the month entire a bacterial count not to exceed 1,000 for Certified and 10,000 for Inspected Milk. So far, one Inspected Milk producer has made his bonus for April and May. It is much too soon to report results from this method, but there seems to be some very good prospects ahead. With the admission of the two new applicants, our Commission will have under its supervision three Certified and five Inspected producers.

Question: Is it possible to differentiate between inspecting the two kinds of milk?"

Secretary: "Sixty per cent of the 2½% is Certified Milk."

THE MILK COMMISSION OF CLEVELAND.

Reprints from our annual report for 1913, printed in the Cleveland Medical Journal of January, 1914, copies of which are available for those who desire them, and the special report on "The Supervision and Control of Modified Milk," to be read

at this meeting, constitute practically the entire record of the activities of the Cleveland Commission during the past year.

Annual Report of the Milk Commission of Cleveland for 1913.

J. J. Thomas, Secretary of the Milk Commission, presented the following report, prefaced by a "History of the Origin and Purpose of the Milk Commission."

As the Milk Commission of the Academy of Medicine was established nine years ago, there are doubtless many members whose connection with the organization is of more recent date, to whom, therefore, the origin and purpose of the Commission are unknown. There are, doubtless, many older members who were once familiar with the early history of the Commission, but who have forgotten it for one reason or other. To inform the first group and to refresh the memories of the second, I shall preface the annual report of the Commission with a short résume of its reasons for being. During the summer of 1904, Dr. George W. Crile being president of the academy, I suggested to the Council, of which I was a member, the advisability of establishing in Cleveland a Milk Commission, whose function should be to arrange with one or more dairymen to produce and put on the market a pure milk for infants and invalids, under the supervision and control of a Commission, according to regulations to be mutually agreed upon, the product to be known as "Certified Milk," the certification to be the guarantee of purity. It was pointed out to the Council that the milk supply of the city was decidedly unsatisfactory, little or no control being exercised over its production or handling, and that the special milk for infants was at least not above suspicion, being in the hands and entirely under the control of private parties, with no supervision, the purity of the milk being taken on faith. The problem was the same that confronted all large cities at the time, five of which, however—four in the East and one in the West—had seemed to have solved it by the establishment of Milk Commissions, following the lead of Newark, New Jersey, where the first Milk Commission was formed in 1893 by Dr. H. L. Coit, for the purpose of supplying a pure milk for infants. The results were so satisfactory in these cities that it was hoped the same methods might be applied with equal satisfaction in Cleveland. The suggestion was favorably received and a committee, consisting of Dr. G. W. Moorehouse and the writer, was appointed to prepare plans for the formation of the Commission. The committee recommended that a Commission of seven members be selected, to be known as the Milk Commission of the

Academy of Medicine of Cleveland, four members to be selected from the academy.

The Homeopathic Medical Society was invited to appoint two members from their body, and the Chamber of Commerce to appoint one member. These societies agreed to co-operate, and with the selection of the seven members the Commission was established.

The Commission held its first meeting December 4, 1904, and organized by selecting Mr. Samuel Mather as President, Dr. J. J. Thomas as Secretary-Treasurer, and Dr. G. W. Moorehouse as Assistant Secretary. On Dr. Moorehouse's removal from the city, Dr. A. F. Furrer was appointed to succeed him.

The personnel of the Commission has not changed since the organization, except that Dr. Gerstenberger was selected by the Academy to fill the vacancy made by the death of the lamented Dr. Edward F. Cushing.

The preliminary expenses of the Commission, amounting to some $800, were taken care of by a fund subscribed by Mr. Samuel Mather, Mr. E. W. Oglebay, and Mrs. W. S. Tyler.

After numerous conferences, including a visit of inspection to the certified farms in the East by the Assistant Secretary and the veterinary inspector, regulations were adopted prescribing the methods to be used in the production of Certified Milk in every detail.

Considerable difficulty was experienced in finding a dairyman who would agree to produce milk under the rigid rules laid down by the Commission, but finally Mr. George W. Canfield was persuaded to make the venture, and a contract was entered into between the Commission and Mr. Canfield, embracing the regulations adopted.

Certified Milk from Canfield's farm was first placed upon the market early in June, 1905. It met with a cordial reception by the medical profession, and apparently filled a long-felt need. The daily sales during the eight and one half years have increased steadily, but not as rapidly as the size of the city would warrant. It would seem that the profession at large is not fully alive to the importance and the advantage of the use of certified over ordinary milks, and the Commission would take this opportunity to urge the more extensive co-operation of the profession in its efforts.

The annual report for 1913 includes a review of the weekly bacteriological tests made during the year, a summary of the tuberculin and chemical tests as made by the experts employed by the Commission, and an outline of the origin and development of Certified Milk in Cleveland.

Appended to this report will be a copy of the contract recently entered into between the Commission and the Belle Vernon-Mapes Dairy Company in regard to the rules and standards adopted in the supervision of the production of Modified Milk intended for infants.

Bacterial Counts.—Of the 48 weekly counts made, 33 were below 5,000, 11 between 5,000 and 10,000, and 4 were high. The latter—28,000, 114,000, 375,000, and 52,000 respectively—occurred between September 11 and October 3, which represents the one period of contamination of the entire year.

One of the sources of this contamination was removed by the superintendent at the farm a few days after the first high count was noted, when he discovered that an apparently healthy cow was giving milk of an offensive odor.

A special visit of our veterinarian, made the day following, failed to reveal any other probable cause of the contamination either among the herd or at any point in the technique of the production of the milk. Daily examinations of the milk were then made for several days by the chief herdsman, superintendent, veterinarian, and Assistant Secretary, the appearance of the milk as it was drawn from each quarter of the udder being noted.

A comparison of the physical properties of the milk, its color and odor, from samples milked directly into the test tubes, revealed two other possible sources of contamination. These cows were immediately removed from the herd.

A bacteriological test of the wash water from six ten-gallon cans was made at this time to test the efficiency of our sterilizing plant. The cans were found to be sterile. The counts remained up, and we are forced to conclude that some unknown source of contamination remained for about ten days or two weeks after the above described sources had been removed.

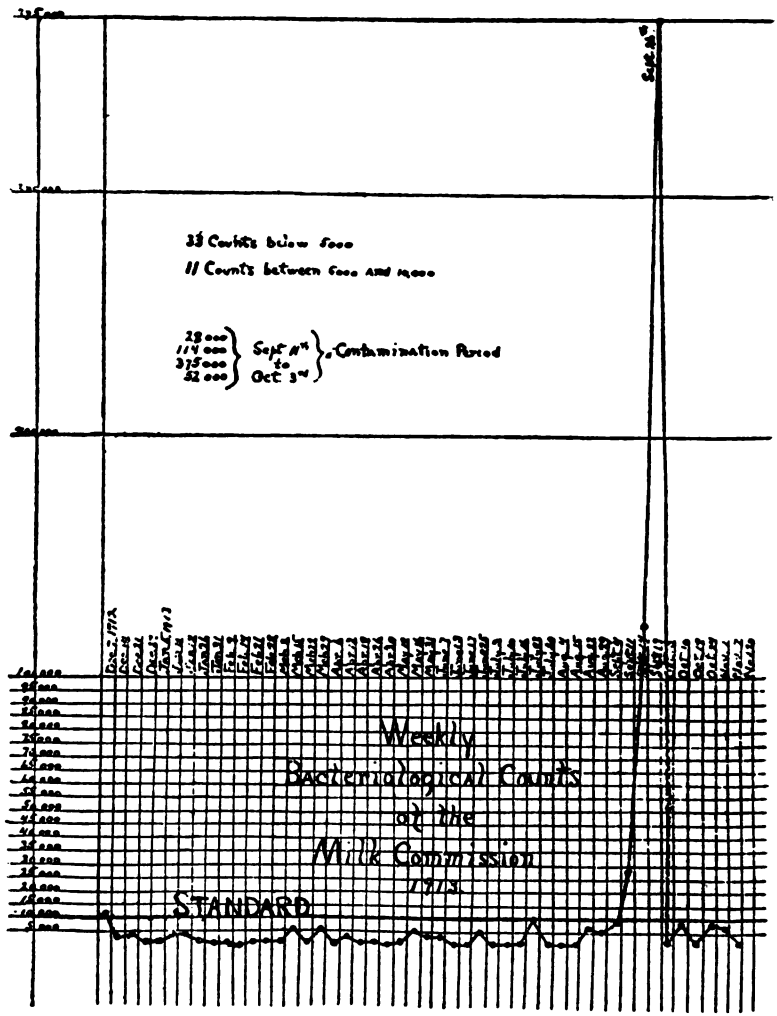
Two chemical examinations were made during the year, the result in each case revealing a milk coming well within the requirements of the standards of Certified Milk. Special tests are always made for the presence of adulterants or preservatives.

Tuberculin Tests.—The annual tuberculin test, performed last May (1913), revealed three "reactors" out of one hundred and forty tested. These cows were removed from the herd at once and sold to be butchered.

The barn floors and stanchions were thoroughly cleaned with soap and water, followed by copper sulphate and carbolic acid solutions. All cows added to the herd during the year were tuberculin tested by our veterinarian, and re-tested by him six weeks later. On the re-test from two and one half to three times the usual dose is always administered.

The health of the employees coming in contact with Certified Milk during the past year has with one exception been excellent. No serious communicable disease was reported.

The demand for Certified Milk has grown noticeably of late. The average for 1912 was 538 quarts; the average for 1913, 740 quarts. The high production day was 955 quarts. These figures do not include 160 quarts of what is known as "bulk certified."



In the future all Certified or Modified Milk customers that so desire may have their milk delivered in thermos boxes. A charge amounting to the cost of the material only will be made. A thermos box will prevent the milk from freezing in the coldest weather, and will assure its remaining cold if delivered early in hot weather.

On September 3, 1913, a request was made by the Belle Vernon-Mapes Dairy Company that the Commission assume regular supervision of the laboratory and the modifying of milk intended for infants. At a special meeting of the Commission, held November 7, it was recommended that the council of the academy empower the Commission to assume such supervision, and a committee was appointed to draw up a contract of standards and rules.

November 15, 1913, a letter was received from the secretary of the Academy of Medicine stating that at the meeting of the Council November 12, 1913, it was "moved that the Milk Commission be empowered to supervise the methods of the preparation of Modified Milk by the Walker-Gordon Laboratory, and to enter into a contract with the Belle Vernon-Mapes Dairy Company to that end."

December 16, 1913, at the annual meeting of the Commission, the contract of standards and rules drawn up by the Secretary and Assistant Secretary was approved, and the latter was appointed as the representative of the Commission to supervise the methods and technique in the laboratory of the Belle Vernon-Mapes Dairy Company.

A copy of this contract of standards will be found appended to this report:

AGREEMENT BETWEEN THE MILK COMMISSION OF CLEVELAND AND THE BELLE VERNON-MAPES DAIRY COMPANY OF CLEVELAND, OHIO.

This agreement, made this ..... day of December, 1913, by and between the Milk Commission of Cleveland, party of the first part, and the Belle Vernon-Mapes Dairy Company of Cleveland, Ohio, party of the second part, in regard to the standards, methods, and technique to be adopted in the modification of milk intended for infants.

WITNESSETH:

Said party of the first part and said party of the second part in consideration of their mutual promises one with the other, as hereinafter set forth, do hereby bind themselves to the following provisions:

Said party of the second part agrees that:

First—The milk from which it will make Modified Milk shall be known as "bulk certified."

Second—It shall cause said milk from which Modified Milk shall be made, to be sealed at the farm and shall allow said seals to be broken only at the laboratory, and then only by a person to be designated by the party of the first part.

Third—It shall cause a sample of "bulk certified" to be taken at least every other day, for bateriological testing, and shall cause a record of the same to be kept on file at all times for reference.

Fourth—It shall have in charge of the modifying laboratory and the separating apparatus, only men who are in sound health and free from any communicable disease, and will hold such men accountable for a high degree of personal cleanliness.

Fifth—It shall cause all receptacles used in the modification of milk to be washed and sterilized in a manner satisfactory to the representative of the party of the first part.

Sixth—It shall cause the capping and sealing of all bottles containing Modified Milk to be performed in a scrupulously clean and expeditious manner, and shall cause its employees engaged in such capping and sealing to give special attention to the proper cleansing of their hands.

Seventh—It shall cause its bacterioiogist in charge of the men engaged in the process of milk modification and cream separation to supervise daily such process and to ascertain daily whether the men engaged in such process appear to be in sound health or have been exposed to any major communicable disease, and shall hold him responsible for the general appearance of the laboratory and the technique employed therein, and shall cause him to supervise the manner and method of cleaning and sterilizing all receptacles coming into contact with Modified Milk.

Eighth—The bacteriological standard of "bulk certified" shall be the same as that required of Certified Milk—that is, 10,000 per cubic centimeter.

Ninth—The bacteriological standard of the 32 per cent cream used in modifying shall be 40,000 per cubic centimeter; that of skimmed milk, 10,000 per cubic centimeter; sugar-water solution, 5,000 per cubic centimeter; lime water, 1,000 per cubic centimeter; distilled water, 1,000 per cubic centimeter, and whey, 10,000 per cubic centimeter. Said whey shall be subjected to heat varying from 150° to 140° Fahrenheit for twenty minutes before being used in modifying.

The party of the first part agrees to appoint a representative of said Milk Commission to supervise the methods and technique of said party of the second part, as hereinbefore set forth, and

said party of the first part shall hold said party of the second part in the modification of milk intended for infants to the same general standards of cleanliness and purity as are required of the producers of Certified Milk. Said party of the second part agrees to pay said representative for said supervision the sum of $10 per month, said representative to make at least ten visits of inspection per month. Should evidence of contamination occur, which would require daily visits of inspection, said party of the second part shall pay said representative at the rate of $1 per visit for all visits over the number of ten made in each month.

Said representative may, at any time, take samples of any of the ingredients entering into Modified Milk for special bacteriological examination, the same being intended as a control of the routine examinations as conducted by said party of the second part. Such special examinations shall not exceed one sample per month, and shall be made by the bacteriologist of the Milk Commission. Said party of the second part shall pay for said examinations at the rate of $5 per examination.

Said party of the first part agrees to allow said party of the second part, during the life of this contract, to place on the caps and the shipping tags of receptacles containing milk modified in accordance with the terms of this contract the words, "The Milk Commission of Cleveland," or such words to the like effect, as the parties of the first and second part agree upon.

It is further mutually agreed that either party to this agreement may withdraw from and avoid the same after giving thirty days' notice in writing to the other party of its intention so to do.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands the day and year first above written.

THE MILK COMMISSION OF CLEVELAND,
By.....
Its Secretary, thereunto lawfully authorized.
THE BELLE VERNON-MAPES DAIRY COMPANY,
By.....
Its ..... thereunto lawfully authorized.

For the first five months of 1914 the Commission is happy to be able to report that there has been no evidence of contamination, as revealed by over two hundred counts made from both Certified and Modified Milk.

The annual tuberculin test just completed shows three reactors out of one hundred and forty-nine cows tested, and in addi-

tion two doubtful reactors. The former were removed from the herd at once and butchered, and the latter are awaiting the usual six weeks' re-test.

No communicable disease among the employees has been noted, and the health of the herd has been uniformly good throughout the year. The chemical examinations have always revealed a milk well within the requirements of Certified Milk.

The demand for Certified Milk has grown noticeably, the daily average for 1912 being 700 quarts; for 1913, 900 quarts, and from present indications the gain for 1914 will be as great, if not greater.

It is possible that in the near future another farm in our vicinity will qualify for the production of Certified Milk, our Commission having been asked to inspect one with that object in view. Should the conditions imposed be met, an immediate increase of two hundred and fifty quarts of Certified Milk per day would be available. **J. J. Thomas, Secretary.**

LANSING, MICHIGAN.

M. L. Holm, M.D.

I represent the Michigan State Board of Health, as well as the Lansing Medical Milk Commission. In Michigan the law governing Medical Milk Commissions is somewhat different than that of most other States. In 1911 the State Medical Society appointed a committee to promote legislation for the protection of the term "Certified Milk." This committee endeavored to secure the passage of the New Jersey act, but met with very strong opposition, especially by legislators from Detroit, where a great deal of so-called "Certified Milk" was being sold. One of the Detroit legislators himself was selling "Certified Milk" that was not certified by a Milk Commission.

Through the co-operation of the Detroit Board of Health, a compromise was effected by amending Section 1 of the bill to provide that Medical Milk Commissions be appointed by the local Boards of Health of cities, villages, and townships, whenever two or more members of such Boards are required by law

to be physicians; otherwise, such Commissions may be appointed by the State Board of Health. Inasmuch as city, village, and township Health Boards have no jurisdiction outside their respective districts, we do not have the county system. There are at present three Commissions in Michigan, viz., Detroit, Lansing, and Battle Creek. Two more, Flint and Grand Rapids, are appointed, but have not yet been incorporated under the law.

Referring to Lansing, we were fortunate in having for governor of the State a man of large means, who interested himself in the dairy business and built near Lansing one of the finest dairies in the State. This dairy is known as the Espanore Farm, and has between thirty-five and forty cows producing Certified Milk. The average sale of Certified Milk in Lansing is about one hundred and fifty quarts daily, in addition to which about fifty quarts are shipped to other parts of the State. Lansing is a city of about 40,000 population, and her general milk supply is controlled largely by the count system. The average bacterial count for each dairy is published every month, together with the name of the dealer. We find this method very effective in securing a clean milk supply for the general public. By this method cleanliness is commercialized. The dairymen compete largely on the basis of bacteria counts, and sanitary control becomes almost automatic. We follow closely the rules and methods of the American Medical Milk Commission, and all counts are made by the State bacteriologist following standard methods. No charge is made for laboratory service. The counts on Certified Milk have averaged between 300 and 1,200 during the nine months the Espanore Farm milk has been certified.

THE MILK COMMISSION OF THE MEDICAL SOCIETY OF THE COUNTY OF MONROE, 1913-1914, ROCHESTER, NEW YORK.

John R. Williams, M.D., Secretary.

The Commission has under supervision five dairies producing Certified Milk. The methods of control of the Commission are as follows:

Three bacteriological examinations and one chemical examination are made of the milk of each producer weekly. Farm inspections have been made at irregular intervals during the year. Each herd of cattle has been tested during the year with the tuberculin test by a veterinarian approved by the New York State Department of Agriculture, and the records of these tests are on file in the office of the Secretary. The Commission requires that these tests be made in the fall. The Commission endeavors to hold a conference each week with the producers, at which time the problems and difficulties which arise are discussed.

The Commission requires that each producer file weekly with the Secretary a report of the condition of health of all the farm residents, including both the dairy workers and the members of the household. It also makes physical examination of each dairy employee and secures his medical history.

The Commission is co-operating with the Rochester Chamber of Commerce and the State Department of Agriculture in the effort to secure milk legislation for the State which will raise the standards of market milk production. It is also co-operating with the Board of Education in an effort to secure pure milk for the public schools, and with the various charitable organizations in their endeavors to improve the condition of the poor.

MEDICAL MILK COMMISSION OF THE EL PASO (TEXAS) COUNTY MEDICAL SOCIETY.

J. A. Rawlings, M.D., Chairman.

The personnel of this Commission has been changed since our last report, one member—Dr. R. B. Robinson—dying, and another resigning, and one new member having been elected and one old re-elected, so that the Commission now consists of Drs. Howard Thompson, Branch Craige, J. M. Richmond, Hugh White, E. B. Rogers, and J. A. Rawlings. Dr. Rawlings is Chairman, and Dr. Rogers, Secretary.

The milk certified to by this Commission is supplied by but one dairy, whose general herd is quite large, consisting of some

five hundred cows. The certified herd, consisting of about fifteen cows, is segregated and kept apart from the general herd, and now has every corral and barn separated from the general herd.

The cows are milked in a special milk-house made of concrete and holding five cows. The house is entered through a dark passage with strips of gunny-sacks suspended to brush off the flies, and the building is as nearly dust and fly-proof as it is possible to build it. The cows only remain in the house while being milked, and after each batch of cows is milked, the milk-house is flushed out with a hose. Because of this special milk-house and the excellent care given our cows before and the milk after milking, our bacterial count runs very low, the average for the months of March and April being 1,478 per c. c. The butter-fat also runs quite uniform. This is regulated by using one Guernsey cow to four Holsteins. However, we have had some trouble with tuberculosis, for in our certified herd of thirty cows, fifteen of which are used for Certified Milk, two cows gave positive reactions in January, 1913, and two in July, 1913, but the herd showed clean in February, 1914.

The manager of our dairy is using every effort to co-operate with us in producing good milk, and we feel that we are getting a fine product.

The dairy is also preparing a casien milk after the formula of Finklestein, for use in infantile diarrheas.

Rules and Regulations of the Medical Milk Commission of the El Paso County Medical Society for the Production of Certified Milk.

The site for dairy must be on land as far removed from the dust of public highways as practicable, and well drained. The barnyard must be well drained, free from mud-holes, and well cleaned daily.

Size of premises must be adequate to the needs of the herd. The barn must be well built, well ventilated and lighted, and ceilings tight if a loft above is used. No unscreened outhouses or cesspools allowed on premises. Proper shade shall be provided for the herd.

Certified cattle shall be kept in separate corral from general herd—however, a few inspected and healthy, eligible for certified

cows may be allowed in corral to fill empty stalls in the unit. A unit to contain not more than forty stalls. This corral shall be at least one hundred yards from any other corral.

The floor shall be of concrete and have proper slope to insure drainage. No food supplies shall be kept in the building where milking is done. No person shall live, eat, or sleep on premises.

Proper and sufficient light shall be supplied to the employees for their use at night. The stables must be kept scrupulously clean, and the manure must be removed twice daily, or oftener if necessary, and in such a manner and to such a distance that it cannot in any way contaminate the milk.

The stables must be whitewashed twice yearly, or oftener if need be. Floors of stalls must be swept and sprinkled one hour before milking to prevent dust at time of milking. No hay or food liable to make dust in the milking house shall be used. If any feeding is done at milking time, the food must be moist grain.

Cows must be well groomed before bringing into milking quarters. The milking quarters and rooms where milk is handled must be securely screened from flies.

Barns must be provided with running water (city or tank), proper basins, brushes, soap, and towels.

Water must be free, pure, and of sufficient quantity, and when obtained from wells, the casing shall be protected by cement to a depth sufficient to prevent contamination from surface water.

Drinking water for cows must come from city water works or from wells below surface water, and served in sanitary tubs—concrete is best.

All cows must be inspected by Commission's veterinarian before entering herd, and every two weeks thereafter. All cows must show negative tuberculin test, and this test must be repeated every six months, or as often as every three or four months if the tests from time to time (in the discretion of the Commission) indicate the necessity therefor. Any cow giving positive or suspicious reaction to tuberculin test, or showing other evidence of illness, shall be allowed to return to herd only on certificate from veterinarian.

All cows must be branded with a definite brand, to be selected by dairymen, so that history of cow, records of tuberculin tests, etc., can be properly kept.

Any milk containing mucus or blood, or from cows that are ill, must be discarded; also milk that accidentally is contaminated in any way while milking. Reject milk from cows sixty days before calving and ten days after.

Before each milking, udder must be cleaned with damp cloth, and washed if soiled.

Long hairs must be clipped from udder and flanks; tail must be sufficiently clipped to clear the ground. The cows must be kept from lying down between cleaning and milking.

No brewery products, except dry, must be used, nor food that gives an upleasant flavor or odor to the milk shall be used.

No milker or assistant shall have any connection with the milk at any stage of its production if he has any communicable disease, or if he has been exposed to scarlet fever, diphtheria, typhoid, smallpox, or any other contagious disease.

Employees must undergo medical examination before being employed, and regularly thereafter at discretion of Commission—examiner and examination to be regulated by Commission, and done free of charge by Commission.

Children under twelve years of age must not be allowed in stables or dairy during milking hours. Cats and dogs must be excluded also from stables; birds and fowls should be excluded at all times.

Strangers and visitors not permitted during milking hours.

After having everything prepared for milking, wash the hands thoroughly with soap, water, and a brush, so that they may be clean when milking is begun; milker must be careful to keep hands dry and not come in contact with milk. If hands or teats become moist with milk they must be wiped dry with a clean towel. Milkers' nails must be kept clean and trimmed.

Suitable, clean, and washable outer garments, such as overalls and jumpers, must be put on before milking. The milking barn must be constructed of brick, concrete, or adobe; if of the latter, it must be plastered inside and out. The floor must be of concrete and so constructed as to be easily drained and cleaned.

The bins and troughs for feeding must be of such construction as not to hold old feed that might ferment in their corners.

The walls and ceiling must be of such construction as not to harbor dust and germs. The building must be well lighted and the windows of a kind that will not open. The building shall be ventilated by the King system. The room for cooling and bottling must be separated from the milking room by a tight partititon with well-fitting doors.

Finally, the building must be as near air and dust-proof as the purpose for which it is used will permit.

All utensils must be as simple in construction as possible, and so made that they may be thoroughly sterilized before each using.

Bottling machines must be properly sterilized with steam or boiling water; sealer must be sterilized at same time. No chemicals shall be used in sterilizing.

If cans are used, all should have smoothly soldered joints, with no places to collect the dirt. Pails should have openings not exceeding eight inches in diameter, and may be either straight pails or the usual shape with top protector and hood.

Bottles must be sterilized with steam or boiling water before milk is put into them, and in order to assist in rapid cooling, the bottles should be previously cooled.

Milking utensils must be of a character approved by the Commission.

Bottles must be capped with "Dacro" caps, made by the Crown Cork & Seal Company, of Baltimore, Maryland; caps must be bought by dairymen direct from factory.

All dairy utensils, including the bottles, must be thoroughly cleaned and sterilized. This can be done by first thoroughly rinsing in water and then washing with a brush and soap or other alkaline cleansing material and hot water, and thoroughly rinsing. After this cleansing they should be sterilized by boiling or in a closed sterilizer with steam, and then kept inverted in a place free from dust.

Milking utensils should be cleaned immediately after each milking.

When milk is being bottled, all doors into bottling room must be kept closed; no empty cases or washing of utensils shall be allowed in the bottling room.

The workers in dairy must wear white, washable suits, including caps, while handling milk. Bottles must be capped with sterilized caps as soon as possible after filling.

The Commission reserves the right to make inspections of Certified farms at any time and to take specimens of the milk for examination, and to impose fines for repeated or deliberate violations of the requirements of the Commission.

The Commission also reserves the right to change the standards in any reasonable manner upon due notice being given to producers.

The rapid cooling is a matter of great importance; the milk should be cooled to 40° F. within half an hour, and not allowed to rise above 45° as long as it is in the hands of the producer or dealer.

Aëration of milk beyond that obtained in the milking is unnecessary.

Milk must contain not more than 10,000 non-pathogenic bacteria to c. c., and no pathogenic bacteria; fats, 3½ to 4%, and

the total solids, 12%. Bacteriological and chemical tests must be made twice monthly.

The names of producers with their addresses will be printed on cards and enclosed with the "Bulletin" every month to all the physicians in town, and each physician will do all in his power to advertise and sell the milk, but no contract or promise to sell any amount will be given.

MEDICAL MILK COMMISSION OF ESSEX COUNTY, NEW JERSEY.

Read by E. G. Wherry, M.D.

The Medical Milk Commission of Essex County, New Jersey, extends greetings to her sister Commissions, and presents herewith the twenty-fifth report of its work.

The demand for a pure and safe milk supply is constantly growing, and the Fairfield Dairy Company, with whom this Commission holds a contract, reports that the demand for Certified Milk has never been greater. The present output is about 7,100 quarts daily. This includes Kummys' cream, and other dairy products.

The output of milk is 6,026 quarts daily, of which 2,990 quarts are certified, including 163 pints. There are 654 cows distributed among the four barns, of which 425 are in the certified herd. The number of men employed on the plant averages about 133. No case of contagious disease has occurred among them during the year.

The dairy maintains thirty-four deliveries in twenty-two cities and townships, including Newark, Bloomfield, Montclair, the Oranges; Verona and Caldwell, in Essex County; and Paterson and Passaic, in Passaic County.

To accommodate its patrons, the Fairfield Dairy Company has for a number of years, beginning about May 21 and continuing through the the summer months, delivered Certified Milk along the Jersey shore from Long Branch to Spring Lake. About one thousand quarts are distributed among the coast summer resorts daily. This Certified Milk sells for fifteen cents per quart and ten cents a pint.

Many improvements have occurred on the plant during the year. The No. 4 barn has been renovated and brought up to modern requirements. A new rotary bottle-filler has been installed in the dairy building, and the latest model of the Doris bottle-washing machine has taken the place of the old one.

Alfalfa is grown on the plant, and four cuttings are made yearly. It is cut and fed green. It is invaluable as a fresh cattle food, especially suited to dry seasons, as its roots dip down sixteen feet underground and pick up moisture not reached by other plants. It is thus a dependable, fresh, green fodder in the hot summer months and a guard against the diminished milk supply, which is so apt to occur in hot weather.

The use of the vacuum cleaner for cleaning part of the cows; modern barns, the new rotary bottle-filler, the enlarged and improved Doris bottle-washing machine, the modern hospital building for sick employees, the cultivation of alfalfa, the testing of all cattle before purchase and the periodical re-testing, the hooded milking pails, the ice and power plants, the maintenance of a bacteriological laboratory on the plant, in charge of a trained bacteriologist—all attest to the enterprise of this concern and the effort to meet the requirements of the Commission in good faith.

The members of the Commission desire to express their obligation to the several experts of the Commission, and to record their appreciation of the co-operation of Mr. Francisco and his associates.

We are glad to announce the return to health of Dr. L. E. Hollister, one of the original members of this Commission, who has been seriously ill during the winter.

Dr. Coit: "The writer of the report, Dr. McEwen, who is confined to his chair and who is carried to his bedroom every night, is a helpless cripple; continually in pain, yet loyal to the work of his Commission and his secretarial duties, it is amazing to see this man work. The reason we are not certifying any dairy besides the one is that the milk in this section has been so checked up that dairies do not want certification. One man did not want the expense of it because he could

sell all his product without it. Much of the milk in and about Newark is good enough to certify, and I believe there is no other reason why we are not certifying more."

JEFFERSON COUNTY MEDICAL SOCIETY MILK COMMISSION, LOUISVILLE, KENTUCKY.

Ben Carlos Frazer, M.D., Secretary.

As Secretary I wish to make a report, owing to the inability of any member of our Commission to be present at the meeting this week.

I would state, first, that the demand for Certified Milk continues to grow, and the output has been greater from month to month since the organization of the Milk Commission.

We have recently had our annual tuberculin testing with the greatest number of reactors that the Jefferson County Commission has had since its organization—due, we think, to the infection from a cow that had been "plugged" in Ohio. This cow had been sold with negative reaction following a test when she was put in the herd some months ago, but reacted at this time, as well as several other cows which had associated with her closely. There were eight cows killed from this herd, the one from Ohio showing great evidence of disease, six others very slight evidence, and one no evidence at all, this one being the second cow which has been killed after testing that failed to tuberculin lesion, the other one being killed two years ago.

Since last year our Commission has discontinued one dairy, owing to the fact that the dairyman could not keep his milk free from gas formants.

Just at this time we are making arrangements to install a milking machine in one of the certified dairies, and hope in this way that we can keep down bacterial infection.

The personnel of our Commission has changed some owing to the death of Dr. John G. Cecil, one of the original members, his place having been filled by Dr. Gavin H. Fulton.

HENNEPIN COUNTY MEDICAL MILK COMMISSION, MINNEAPOLIS, MINNESOTA.

G. D. Haggard, M.D., Chairman.

The past year this Commission has certified the milk from two dairies. It has authorized from one of these, for some years, a "Special Inspected" milk with bacterial grade of 50,000 or under. From these dairies a total of eight hundred quarts daily is sold in our city. Two thirds of this is Certified Milk at 15 cents.

The milk is largely used in infant feeding, but enters one large dining-room, one club, and one hospital. We have a plan regarding hospitals indicated by the following: We now have sixty cards, signed by influential physicians, which read: "To each hospital in Minneapolis, I, the undersigned, hereby request of you and prescribe that each patient under your care and my direction shall receive in his diet, aside from cooked milk, only such milk as is certified by the Milk Commission. The added cost above that of market milk to be charged to the account of the patient. Signed ———." From this scheme a good beginning has been made, on the essential education of physicians and laity alike, that the sick at least are fully entitled to best of milk.

Very few instances of any complaint of milk have been heard this year. Tuberculin bacillus was found in one herd—in animals bought on certificate, but reacting later when on farm.

Fat content of milk has been 3.60 to 4%. One dairy has pure Holsteins, one has two thirds Holsteins and one third common red cattle.

We have agreed to certify a third dairy product of size equal to both the others when the conditions are fully met.

Dr. J. P. Sedgwick: "We have to face a big situation, as there is also in Saint Paul a Commission which is not a member of our organization. The station is fully protected, because they are certifying milk from the same dairy we are and we know that it is all right—the same kind being sold in both cities. However, I should like to have the Association urge them to come into the fold, although they do not care to do so."

Moved by Dr. Sedgwick that the Secretary be authorized to confer with the Commission and invite them to join the Association. Seconded and carried.

PHILADELPHIA, PENNSYLVANIA.

William N. Bradley, M.D.

I would like to report for the Philadelphia Milk Commission that we are at present certifying five dairies, three of which are giving constantly good bacteriological counts. There are about four hundred cows in the certified dairies, producing about thirty-five hundred quarts of milk. The examination of the milk is made each week. A visit is made to the dairy once each month by a doctor. One farm has caused us some trouble during the past year, but during the last month it has straightened up. On this same farm a few months ago there occurred an epidemic of scarlet fever, but the Commission immediately took charge of the matter and there was absolutely no infection of the milk.

One dairy has tried out the milk machine, but not at all successfully, as they found that it made the cows very nervous and reduced the amount of milk fully one half. There is a new milk law, which is to go into operation in the city of Philadelphia on the first of July, which provides for three grades of milk coming into the city, including pasteurized milk, raw milk from tuberculin-tested cattle, and Certified Milk. Our Commission is taking up the matter with the Board of Health, and trying to have them permit only Certified Milk that is certified by the Philadelphia Milk Commission.

PITTSBURGH, PENNSYLVANIA.

H. T. Price, M.D., Secretary.

Following the action of last year, when no reports were read, I did not prepare a report for this meeting. I would like to say a few words, however. At the last meeting of the Allegheny County Medical Society Milk Commission, a resolution was passed that all physicians on the different hospital staffs in the city be requested to prescribe Certified Milk especially for their

private patients. In Pittsburgh the city maintains twenty stations, under the direction of Dr. Burns, at which Certified Milk is distributed to the poor, and we feel that through these stations we are supplying Certified Milk in a permanent manner to the public.

Dr. McCleave: "I notice that we have for several years carried the name of Sacramento. There is no Association there and never has been, and they do not deserve the honor of being carried."

THE SAINT LOUIS PURE MILK COMMISSION.

Adrien Bleyer, M.D.

Mr. President, Gentlemen:

I have been sent here to report progress and increasing interest in Certified Milk in Saint Louis. The Saint Louis Pure Milk Commission is one of the older organizations. Our charter was granted in 1904 and Certified Milk appeared on the Saint Louis market in 1907. The growth of the movement since then has been steady, as may be seen from this chart, which shows the sales in gallons for each year, 1907-1913 inclusive: 1908, 360,000 quarts; past four years, about one million quarts per year.

Since the beginning the Saint Louis Commission has granted certification to ten dairies; six are now active and four have dropped out—one of these at our order, two others because of the expense and labor incurred, the distances from market, and dissatisfaction with distributing agents. The sales from each of these dairies ranged from fifty to one hundred gallons per day; they were the pioneers in the movement with us, and we very much regretted their retirement; the fourth dairy was discontinued because of the ill-health of its proprietor.

Coincident with the growth and interest in the Certified Milk movement in Saint Louis there has been a general awakening of interest in the milk supply of the city; this is evidenced by certain strong steps taken by the City Club, the Business Men's League, and the Municipal Health Department. Upon the solicitation of the City Club, new ordinances pertaining to the regulation of milk were drafted; many of these are now in force. These changes were fostered and supported, and several of them origi-

nated by members of the Pure Milk Commission, and we hope and expect to do a great deal more than has yet been done.

The body which supervises the certification of milk with us is made up of twenty-four members; with three exceptions they are all physicians; every pediatrician in Saint Louis is affiliated with this body and takes an active interest in its work. Monthly meetings have been held without a single exception since the work began, and are well attended. Dairy inspections are made by these members occasionally; each has one or several inspections to his credit, and we have a paid inspector who is immediately in charge of the service. The expenses of certification have been met by a tax of one per cent on the gross retail receipts of all Certified Milk sold; this has always been willingly paid by the producers, and has met all expenses incidental to certification; at this moment we have a surplus of about four hundred dollars in our treasury from this source.

The price at which Certified Milk is sold in Saint Louis has not changed materially at any time; it is sold at 15 cents a quart and 8 cents a pint, and not at this moment, nor at any time, have we had any desire either to lower or raise this price; the whole thing seems to be on a very substantial business basis.

Bacterial counts and chemical examinations have been made weekly by the City Health Department without cost to us, and have been highly satisfactory; somewhere in the neighborhood of two thousand counts and an equal number of chemical examinations have been made. Moreover, we have recently equipped a bacteriologic laboratory of our own for carrying on such work as we deem desirable; our inspector of dairies is a trained chemist and is in charge of this laboratory.

In the past the maximum bacterial count allowed by the Saint Louis Pure Milk Commission has been 30,000; at the last annual meeting of the Commission, on the recommendation of our President, Dr. George M. Tuttle, we raised it to 10,000, to comply with the standard approved by the National Association.

Dr. Bleyer also said: "The sales of milk with us amount to about 1,000,000 quarts a year, or 2,000 a day; of course, it is more heavy in winter than in summer."

WHEELING CERTIFIED MILK COMMISSION, WHEELING, WEST VIRGINIA.

Andrew W. Wilson, M.D.

The Wheeling Certified Milk Commission is pleased to report a considerable extension of its usefulness, as evidenced by an increase in product of thirty-five per cent in the past year.

Our Commission certifies milk from one dairy, the Hill Top Farm, of Wheeling, which is supported by the Lawrence A. Reymann Estate, and we are rather proud of the fact that our milk scored 94.90% at the National Dairy Show in Chicago last year.

Upon their own initiative, the owners of Hill Top Farm have recently expended an approximate sum of $3,500 in making improvements to the plant, including a remodeling of the milk room, a new floor for the barn, new stanchions, and plastered sidewalls and ceiling.

The public is beginning to show an appreciation of the fact that clean, uncooked milk from tuberculosis-free and otherwise healthy herds is a desirable food and is not intended exclusively for infants and invalids.

What may be termed the indirect usefulness of the certified plant has been directed in slightly different channels than heretofore.

Until July, 1913, Dr. W. H. McLain, Secretary of our Commission, was also Wheeling's health officer, and in all published Health Department scores and bacterial counts, Hill Top Farm and Certified Milk were used as standards for the emulation of those producing commercial milk.

The political exigencies of ward politicians dictated his removal from office at the end of his third term, thus terminating the close relationship existing between the Commission and the Health Department.

Because of this, the Pan Handle Agricultural Club, an organization of farmers with whom the United States Department of Agriculture and the State Department of Agriculture co-operate, has been the means of spreading the gospel of clean milk, healthy herds, and pure-bred dairy cattle.

During the past year a meeting of the club was held at Hill Top Farm, at which the organization of the first cow-testing association in the State of West Virginia was accomplished.

I believe the great influence that organizations of this kind will ultimately have on the quality of market milk is not generally appreciated by Milk Commissions or Health Departments.

Dr. Wilson also said: "Wheeling Medical Milk Commission occupies to a certain extent a unique position, in view of the fact that we certify but one farm, and that farm is run and maintained as a memorial to Lawrence A. Reymann, its founder. This obviates a good deal of trouble, because our producer is even more anxious than the Commission about the quality of the milk, and the work being done on the farm at the present time is absolutely voluntary and without any compulsion whatever from the Milk Commission, so that our relations with our producer are absolutely of the closest, and when anything is desired it only needs to be mentioned as a suggestion. We certified about 10,000 quarts in May to a population of 45,000 or 50,000."

MILK COMMISSION OF THE ERIE COUNTY MEDICAL SOCIETY, ERIE, PENNSYLVANIA.

Fred E. Ross, M.D.

Our Milk Commission was organized in 1909. After some investigation, a dairyman was found willing to produce milk according to the requirements of the Commission and to take his chances financially. After most of the arrangements had been made, the barn at the dairy caught fire and was totally destroyed with all its contents. This delayed for a year the production of Certified Milk, but in June, 1910, the first milk was put upon the market. Erie at that time had a population of about 72,000, but there was not enough co-operation among the medical profession in recommending the milk, and during the first year the sales averaged less than one hundred quarts daily, and was produced at a financial loss to the dairyman. Business was not much better the

next two succeeding years, but during 1913 the sales increased to over two hundred quarts daily and the project assumed a paying basis.

The product as a whole has been satisfactory, the bacterial counts having but once or twice gone above the maximum limit of 20,000 in summer and 10,000 in winter, which were the requirements when the Commission was first organized. The maximum has since been placed at 10,000, in conformity with the suggestions of this Association.

On account of two successive high counts of 19,000 and 15,000, together with unsatisfactory conditions at the dairy, certification was suspended May 1 pending better conditions. Since that time frequent examinations have shown a good count, in one case 700, and indications seem to point to the installation of a better equipment at the dairy, so that the certification will probably be resumed in a short time. One great difficulty has been in getting satisfactory help at the dairy, ordinary farm hands not being able to comprehend the significance of the extra precautions advised. Recently, however, the services of a graduate of an agricultural school have been engaged, and this fact also makes the future look more promising.

We think that the establishing of the Commission has had a stimulating effect on the quality of the general milk supply, and during the past year or two the health authorities have been very active in supervising and correcting the output of the dairies supplying the general public. Market milk sells in Erie at seven cents per quart, and the price of the Certified Milk is twelve cents.

President: "Are there any delegates present whose names have not been called?

"We will now have a very brief discussion of the reports of Commissions."

Dr. Coit: "In February I spent four days in Lewiston, Maine, meeting three medical societies in joint session, which met to consider the question of pure milk. I think a new Commission will be added to your list. While there I saw

a plant in which the milking machine was used exclusively to draw the milk from the udder. For some time after it was removed the tissues were turgid, and it seemed to me that its constant use would often result in abscess. In 1911 I had the honor of representing this system at Budapest. I was very well received, and while they have not yet a Commissions there, they admit its value. I met a doctor, Siegfried Weiss, of Vienna; I returned to Vienna with him and remained one week, attending a meeting of pediatrists, at which time a Medical Milk Commission was organized.

Moved that the Secretary be instructed to write this doctor, sending him the official greetings of the Association and their congratulations on what he has accomplished.

Seconded and carried.

President: "Thus far eighteen Commissions have reported through delegates or by means of communications. I was interested in the report of the Brooklyn Commission, in which it was stated that the typhoid test inoculations were being used. I also would like to ask if any one present has any knowledge of a case of infectious disease attributed to Certified Milk during the past year; also what Commissions have systematically practiced the anti-typhoid vaccination among dairy employees. It seems to me this would be a peculiarly practical demonstration of the value of anti-typhoid vaccination as a preventative, and it should certainly be a safeguard to the public."

Dr. Van Derslice: "I believe Certified Milk should be kept above the law. I believe there are enough cases on record to show that it is best to stop the use of the term "Certified Milk" for a milk sold as Certified Milk not produced under a Commission appointed by the County Medical Society. I believe it would weaken our influence if we tried to get through State laws or State ordinances. In Chicago they do not dare to use the term "Certified Milk." They cannot make Certified Milk, and I do not believe the Health Depart-

ment of the city of New York would dare to try to make it. Certified Milk is produced under a Milk Commission. You do not know what standards we are going to ask next year or a year later. Two years ago, at Louisville, several said that 20,000 was so low as to be impossible. As an Association we can change these standards from year to year. We certified the milk at a cost of one half cent a quart last year, with an expense of about $15,000—$9,000 for advertising and the balance for certification—and that is a little less than one half cent a quart."

Dr. Louis C. Agar, Brooklyn, New York: "I want to take issue on the question of law. It depends upon what type of law you have. In New York we have a law that defines that the Milk Commission appointed by the County Society must certify the milk. In other States the Legislature will not delegate the power.

"In regard to the milking machine—I have been skeptical for the past year as to the practical effect on bacterial counts. I have been officially assured that they seem to be entirely satisfactory in every way. One of our dairies in particular says that in a certain period of time there was no diminution in the milk supply, nor was there any injury to the cattle."

Dr. M. L. Holm: "I believe proper legislation is an important factor in controlling the production of Certified Milk, as well as the commercial grades. In the larger cities the financial status is a prominent one, and important influences may be controlled without legislation. Most of our Milk Commissions, however, are not in the large cities, and it is necessary to give legal authority to the Commissioners, as well as to protect the term. If no one is legally responsible, there is likely to be no particular interest, and Certified Milk will often be sold without proper control. In Michigan the standards of the American Association of Medical Milk Commissions are recognized, and no Commission will be appointed without the endorsement of the representative medical society, which does away with the objectionable political phase.

"We have taken up the question of anti-typhoid vaccination of employees. I question the advisability of such vaccination in connection with a certified dairy. This procedure is to be recommended where individuals are unduly exposed to typhoid infection, and is generally conceded to be a protection for the vaccinated individual rather than a protection for others against him. If conditions around the dairy predispose to typhoid, they should be corrected. But if a man at the dairy should become infected, it would seem safer for the consumers if the case could be recognized and isolated than if the man was immune and continued in the service."

Dr. E. G. Wherry: "We have done a little work for the avoidance of typhoid carriers: we have examined the blood of some of our employees, but we have not as yet vaccinated any; our idea is that if we find a man whom we suspect to be infected, we will examine the feces and ascertain if we have a typhoid carrier."

Member: "I hardly think the use of anti-typhoid vaccination is necessary in a dairy. We have been using it, but would not recommend anti-typhoid vaccination generally. If you take the large number of carriers, such cases are, of course, frequent enough to be guarded against, but they are not the rule by a large majority. How many did they find in Washington?"

President: "They attributed two or three of the serious tuberculosis cases from milk to the carriers."

Member: "I cannot see any real objection to the use of the anti-typhoid vaccination, but I really do not think that it is necessary to use it for all dairy farm employees."

Dr. E. C. Levy, Richmond, Virginia: "I would like to ask whether we may not do more harm than good by vaccinating all persons on our dairy farms against typhoid fever. Will we not be in danger of developing carriers, who will cause far more trouble than frank cases of typhoid fever, because they would not be likely to be recognized?

"In Richmond every case of contagious disease is investigated and the data carefully studied with a view of locating the cause. We have had dairy inspection for seven years, and during this entire period we have had no typhoid fever or scarlet fever due to milk. We had a small outbreak (seven cases) of diphtheria, in August, 1908, due to milk. We do not invariably shut out a man's milk supply when there is a case of typhoid fever on his dairy farm. If the case can be satisfactorily isolated, and if we believe that our directions will be followed, we allow the sale of milk to continue. I believe to shut out the dairymen's milk supply in every instance will result in deliberate failure to report cases. We have had six cases of typhoid fever on dairy farms. In three of these cases we shut out the milk supply temporarily, while in the other three we believed it safe not to do so. As stated above, we have had no typhoid fever due to milk for the past seven years."

Member: "The typhoid vaccine is directed to the future, and the treatment of the stool for typhoid carrier is directed to the present. The examination of the stool is necessary to make it certain."

Dr. John J. Thomas, Cleveland, Ohio: "Some results have been obtained in diphtheria. In some hospitals they refuse to give the antitoxin because it may produce carriers. It seems to me that we would meet with the same results with the use of anti-typhoid vaccine. It is a question if there is much danger if we insist on proper washing of the hands. In some places no precaution is used except thorough washing of the hands, and it practically eliminates communication from case to case."

President: "I mention the question because it is of special interest to me. The question of anti-typhoid vaccination has been given a good deal of attention, but of course we should not over-emphasize any particular measure that will hinder the improvement of sanitation. It occurs to me that the use

of anti-typhoid vaccination among dairy employees would be more beneficial than in any other portion of the population.

"This afternoon we have important papers, and would like as much discussion of them as possible. If there is no further business, I should like, therefore, to entertain a motion to adjourn until 2 o'clock promptly."

Dr. H. L. Coit: "In April the New York Medical Journal published an editorial on septic sore throat. The editorial made this statement, that the Boston epidemic of septic sore throat was traced to a dairy where the sanitary arrangements were the best, and to Certified Milk in which bacterial inhabitants were low. I did not believe the Boston epidemic was due to Certified Milk. I wrote to Dr. Richard Smith, and he denied it; that encouraged me, and I wrote many letters concerning the matter. The editor tried to put the responsiility upon somebody who wrote the editorial for him, but his final letter acknowledged a misstatement and said, 'I hope that will be satisfactory.' I said it would not be satisfactory, and the only may to make it so was to publish a retraction. In the issue of June 1 there appears a beautiful correction, stating that the trouble was not conveyed through Certified Milk."

Moved, seconded, and carried that the report just made by Dr. Coit be made a matter of report. A vote of thanks was extended to the doctor.

President: "I want to urge that the meeting begin at 2 o'clock this afternoon and adjourn promptly at four, on account of the arrangements for the evening."

Adjourned to two o'clock.

SECOND SESSION.

Friday Afternoon, June 19, 1914.

The meeting was called to order at 2:20 P. M., President Kerr in the chair.

President: "We now come to the presentation of formal papers. The first is the annual address by the President." He read as follows:

THE NEED OF CO-OPERATION IN SECURING PURE MILK.

By J. W. Kerr, M.D., United States Public Health Service, Washington, D. C.

The Presidents of our Association have in past years presented references, biblical and otherwise, regarding the importance of milk to the prosperity of nations; traced the slender threads of legal control of this product, beginning with the action of the Venetians in 1599; defined the hearing on health of the plan for the production and handling of Certified Milk, and outlined to some extent the policies that should prevail in carrying out this plan in future.

It would accordingly appear that my task this year was a light one. But in reality it is difficult, because the field has been so widely covered in the past and because unsolved problems have arisen which are vital to the objects to be accomplished by the Association.

As one of your representatives and as the delegate on behalf of the Federal Government to the English-speaking Conference on Infant Mortality, held in London, August last, I arbitrarily classified supervision of milk supplied in the United States in point of time as representing three epochs, viz.: From 1855 to 1880, during which time the object was essentially the prevention of fraud; from 1880 to 1890, when attention was devoted primarily to dangerous milk; from 1890 to 1913, during which time the object has been mainly the production of safer milk.

This latter epoch in reality had its inception in the development of the science of bacteriology and the devising of a plan by Coit by which scientific methods would be applied in the production of clean milk, or what he was pleased to call "Certified Milk" for clinical purposes. The ideals set forth by him over twenty years ago are essentially the same as prevail to-day, and it is

these ideals which this Association is organized to elevate and perpetuate.

With the advance of time, however, there has come a more widespread recognition of the need for clean milk. Additional unofficial agencies have sprung up, and official agencies are devoting their energies in greater degree than ever before to guaranteeing clean milk as well as safe milk.

The days of the simple chemical examination of milk samples for adulteration have passed. The days of the inspection solely of herds and the examination of milk samples bacteriologically have likewise passed, until to-day clean milk represents the results of a fourfold effort, viz., chemical analyses and bacteriological examinations of milk samples, veterinary inspections of herds, and medical supervision of employees.

As the complexities of the milk situation in relation to the public health have become more and more recognized, it has also become apparent that larger forces must be mobilized to meet this situation, and there should be cordial co-operation on the part of all these forces.

The plan for which this Association stands, and which should not militate against official measures, contemplates the active interest of the medical profession, which is highly desirable and which has not been as manifest in the past as it should have been.

Medical Societies and Health Officials Should Co-operate.

Being a health official, and having been connected with this Association since its organization, I can appreciate the need of co-operation between official and non-official agencies in health matters—and the milk problem is one of the most vital of these.

Health officials who have within their jurisdiction an enlightened medical profession which is willing to aid in securing clean milk should welcome its efforts. A former President, in his annual address, said:

"Wherever a Milk Commission has been established and maintained for any length of time, it has resulted in an improvement in the general milk supply. It has taught the medical profession and the laity the advantages of clean milk, and both the producer and dealer have read the handwriting on the wall."

I think nobody would expect the Medical Milk Commission plan to supersede or to interfere with official action. On the other hand, its influence in setting high standards, in creating a demand for better dairy hygiene, and in supplying even a small amount of the highest grade milk should be beneficial to the community and a stimulus and aid to health officers.

In my opinion, it would be desirable for these officers to be *ex-officio* members of Commissions within their jurisdictions, and where facilities are available, the bacteriologic and chemical examination might well be made in municipal laboratories. So far as the medical society is concerned, the most important functions of its Commission should be to maintain medical supervision over the health of the employees of dairies which it certifies, to secure intelligent co-operation of dairymen, and to have knowledge of the effectiveness of its plan.

The close co-operation referred to would reduce the cost of certification and in reality afford the health department moral support and a certain amount of expert medical service at little or no cost to the community.

Live health departments need the support of physicians, and physicians in turn must needs have some means of giving this support, else public health work will in time pass from the medical profession into other hands.

Official and Unofficial Agencies Should Co-operate With Dairymen.

Then, there is need of cordial co-operation on the part of all with the producers of clean milk. It is just about as difficult to conform to present-day high ideals of dairy hygiene as to the ideals of aseptic surgery. Intelligence and honesty are two requisites necessary to the production of Certified Milk, and the dairyman who is attempting to do so should feel constantly that he has the support of health departments and medical organizations in his efforts. In his interest, as well as that of the community he serves, dishonest methods on the part of others should be ruthlessly exposed. Medical societies also should jealously guard against allowing their stamp of approval to appear on milk pro-

duced by questionable methods. The public generally has a high regard for certificates relating to health matters, and its trust should not be betrayed.

To my mind, the great value of Certified Milk production is educational. It is a demonstration in which the dairyman takes the major part. Without his effort, nothing can be done. His work, therefore, should not only be supervised, but participated in and extolled, whereby his product will receive the recognition it deserves. In traveling out of Cincinnati, Ohio, several years ago, I was agreeably surprised to find that the Medical Milk Commission of that city had been influential in having Certified Milk supplied on dining-cars of the Big Four Railroad. Not only was this a means of educating the public, but an excellent advertisement for the dairyman concerned.

Such advertisement leads to a demand in distant places for clean milk, and practically forces the hand of unclean and slovenly dairymen. The result is that milk production generally is improved.

I fear the tendency in the past has sometimes been for Milk Commissions to execute rigid contracts and then feel that their task is done, the attitude toward the dairyman being, "Now, carry it out if you can, but I would like to see you do it." It takes two to make and carry out a bargain, and the Medical Milk Commission should do its share by maintaining constantly helpful supervision over the different technical procedures which the dairyman daily has to observe. By this means only will Certified Milk represent what it purports to represent, and methods and standards be intelligently elevated.

Unofficial Agencies Should Co-operate With Each Other.

Likewise, unofficial agencies should co-operate with each other. Though approaching the milk problem from different angles, their general object is the same. By this means there will be a better understanding on the part of all as to the aspirations and methods of the different agencies, and each will recognize and respect the field of the other.

I believe it would be highly desirable for this Association to

have representatives at meetings of other Associations held during the year, and receive back reports of the transactions. Discussions of these reports would follow, and a clearer idea be obtained of the relation of these organizations to the Association of Medical Milk Commissions.

As interest in sanitation has increased and public health organizations have multiplied, there has undoubtedly been lack of correlation of effort. It should be the duty of our Association to perpetuate its ideals, and it has been a great satisfaction to me to be identified with a work which is now going on at an increasing rate in cities of our country.

The lack of a paid secretary, who would be able to devote all his time to extending the Certified Milk propaganda, is to be deplored. It is almost as important also to have a current publication by which the work of the Association will be brought to the attention of the medical profession and the public. Both of these needs are more fully recognized, perhaps, by our Secretary than by any other. For this year I would suggest that the contributions to the program be submitted to the Journal of the American Public Health Association, or other current publication, to be used in so far as possible and as early as possible.

Above all, I think this Association should request the cooperation of every medical society in the formation of a Milk Commission, and every society which already has one should be requested to assure itself of the results of the work in order that its standing as a public organization may be protected and the cause of clean milk advanced.

Introducing Dr. Koplik, the next speaker, President Kerr said: "A number of years ago it became my duty to prepare a short history on this subject for publication in an official bulletin, and I gave credit unwittingly to an establishment in Hamburg, Germany, as being the first Infants' Milk Depot established in any country. Immediately after the bulletin was issued my attention was called to the fact that I was mistaken. I was glad to make the correction of my mistake, and it was a great pleasure to do so because of the fact that the first infants' milk depot in the world was established in

New York in 1889, by a member of our profession. That member, Dr. Henry Koplik, is present to-day, and I have great pleasure in introducing him to read the next paper."

THE HISTORY OF THE FIRST MILK DEPOT OR GOUTTES DE LAIT WITH CONSULTATIONS IN AMERICA.

By Henry Koplik, M.D., New York.

When I returned from my studies abroad in 1887, I was appointed attending physician to the Good Samaritan Dispensary, New York City. I had control of the service in diseases of children, and at this time there was an undercurrent of feeling that the treatment of children in dispensaries needed the introduction of new ideas as compared to what was then in vogue. In all dispensaries or outdoor clinics in children, then as now, the mass of cases have among them as a large quotient the disorders of the gastro-intestinal tract. It was customary then, as often now, to treat these cases in a most routine manner. The infant was prescribed some mixture, and the mother sent away with some instructions and allowed to find the best way she could of carrying out the directions given her. She might remember some and forget others which were of vital importance. It mattered very little. I felt that this was entirely unsatisfactory. As we believed, then as now, that the food of an infant was of first moment in its recovery, I determined to place the food at the disposal of the infant, leaving the administration of drugs to take a secondary place. With this idea in view there arose, in 1889, the first milk depot or *gouttes de lait* in my dispensary, At first I put the milk up in separate bottles and sterilized it. The apparatus was exceedingly simple. After sterilization, the milk was placed in the keeping of the apothecary of the dispensary, then the Eastern Dispensary, and was given to the patients only on prescription. The sick infant was first seen by me, and then the mother received her directions and milk, and was told how to use it—to give it whole or to dilute it with barley gruel in definite proportions. After having given this to the mother, she was directed to bring the infant at regular intervals; it was weighed, watched, and treated.

This simple innovation seemed to create quite a stir among the mothers, and met with ridicule and opposition from the unthinking. The results, however, began to attract attention. The sterilized milk in separate bottles, each bottle to be given at certain intervals to the child, was looked on by my mother-patients as something short of marvelous. The mothers and babies flocked to my dispensary. In addition, physicians came to watch the effect and the manner of this innovation in the treatment of gastro-intestinal disorders of infancy. So successful was this departure that in May, 1890, I was persuaded to show my methods and apparatus, and describe my milk depot—then a year in existence—before the New York County Medical Society. I remember well the rather distant and patronizing attitude of my audience. A well-known pediatrist at this meeting remarked that the milk depot could never become popular on account of the labor of washing the bottles, and therefore it must perforce be very limited in its application. I persevered, however, and November 12, 1890, I made a communication[1] to the New York Academy of Medicine, Pediatric Section, of my work in establishing my idea of milk depots or dispensaries for the feeding and treatment of infant intestinal disorders. In this paper I pointed out that medical supervision must go hand in hand with the administration of milk and food. The milk which I utilized was the best I could obtain at the time, and being without means to supply milk from my own farm, and Certified Milk being unavailable, I went into the open market and bought the best bottled milk, sterilized it in separate portions, and thus did the very best I could for my patients. This work was not without results. I felt that the patients who came to be treated were so troubled and often so ignorant that the milk must be placed in their hands ready for the infant, and all they would have to do was to give it at proper intervals. Thus the first milk depot, *gouttes de lait,* in connection with medical advice (consultations), became an established fact in America. When the old Eastern Dispensary moved into new quarters and assumed the name of the Good Samaritan Dispensary, a lay committee furnished funds to enable me to extend the field of usefulness of this

[1] Koplik, Henry: The Administration of Sterilized Milk in Dispensaries, New York Med. Jour., Jan. 31, 1891.

new idea of milk depots. I then devised new apparatus, and in a short time, with a large staff of helpers, we were enabled to extend our work materially and feed large numbers, sometimes two hundred infants daily, with milk put up in formulas in separate nursing-portions. This was in 1891. The facilities of thus treating infants with intestinal disturbances was not limited to dispensary patients, but physicians were invited to send to the milk depot and have certain formulas prepared for their patients. During all this time the campaign to further this method of caring for sick and well infants received most decided opposition, as every new departure will, and also great encouragement. Infants in my service were weighed, watched, and fed; those from other physicians were not controlled. Thus the first milk depot, *gouttes de lait,* with medical control became the topic of interest in all quarters, and even the daily press found something of interest in this new departure.

At first the milk, as I have indicated, was given whole, sterilized, to the patients, and the patients directed to dilute it according to directions. It was soon found that this was not enough. The patients must have the finished formulas put into their hands ready to give to the infant. They could not be trusted to dilute it correctly. The milk became contaminated or spoiled in the handling of it. It was then decided to give each infant a definite formula and quantity, according to its age, and thus each child was studied as to the best method of feeding. In a milk depot only a few formulas could be put up which would apply to the largest number of infants as an average application. Thus, for the infant from birth to the third month, the Meiggs formula was prepared. As is well known, the Meiggs formula contains 1 per cent protein, 3 per cent fat, and 6 per cent milk sugar approximately. For infants older, from the third to the eighth month, the so-called Heubner-Soxhlet mixture was advised, and in addition whole milk in the sterilized or pasteurized state was furnished to mothers. All the apparatus, including that for sterilizing or pasteurizing the milk, the device for cleansing the bottles, and those for refilling, were of my own models. The great principle followed was not merely that our milk depot be re-

garded as a place where milk was sold, but where a carefully conducted daily clinic took care of the sick or even well infants, treated them individually, and gave each infant the food fitted for it. Infants were all systematically weighed once or more a week, and the Good Samaritan depot became the Mecca of mothers with sick babies, and of physicians who were interested in the advanced treatment of gastro-intestinal disorders and the feeding of sick and well infants and children. In the New York Medical Journal of February 4, 1893, I described[2] the first two years' work of the milk depot under the enlarged and perfected plan. I there stated the origin of my milk depot idea in 1889 and its development. I had found as a matter of interest that the old form of sterilization at 100° C. was not as desirable as would be a lower degree of sterilization, and it was shown that in a public milk depot heating of the milk at from 65° to 68° or 70° C. was too low, as careless handling by the mothers soon allowed the milk to sour in twenty-four hours, whereas 85° to 90° C. was sufficiently high to trust them with the milk in the heated term, and the milk would keep quite well in a moderately cool place for twenty-four hours. In the previously mentioned article I also published the work of 1891 and 1892 with the improved facilities and new buildings of the former Eastern Dispensary, now the Good Samaritan. At that time "Certified" Milk was not generally obtainable, so I obtained the best milk in the open market in cans or bottles—a much better milk than was accessible to my patients. The work done in this milk depot during the years 1891 and 1892 was as follows:

Separate nursing-portions	101,482
Infants and children supplied	1,274

Inasmuch as these children all passed under my direct daily supervision and treatment it can be surmised that the work done was little short of herculean. In this article I calculated that the number of children who received the control of food and advice, for any length of time, was 539, for the two years. The following figures show the work done in the first year of the existence of

[2] Koplik, Henry: The Sterilization of Milk at Low Temperatures and the Equipment of Milk Laboratories for Infant Feeding, New York Med. Jour., Feb. 4, 1893.

the milk depot of the Good Samaritan Dispensary. It is still in existence, feeding, on an average, 130 children daily.

RECORD OF FIRST TEN YEARS' WORK OF MILK DEPOT OF GOOD SAMARITAN DISPENSARY.*

Year.	Bottles Supplied.	Children Supplied.
1889	7,000	137
1891	44,111	574
1892	57,371	700
1893	70,068	976
1894	70,705	720
1895	75,550	932
1896	96,313	766
1897	155,989	1,064
1898	298,674	1,204
Total	875,781	7,073

*Records for 1890 lost.

In the first work on milk and its relation to public health from the United States Hygienic Laboratories, this work escaped notice, but in a subsequent revision by Dr. J. W. Kerr, of Washington, I had the satisfaction to see the work of this pioneer character mentioned.

I can say thus that the original idea of putting into operation the milk depot in direct connection with dispensary treatment originated in the United States, in the Eastern Dispensary, in the children's service of which I was chief, and was perfected in the present form in which it still exists in the Good Samaritan Dispensary, as I have shown. I remember well my insistence to students who visited my clinic and milk depot and laboratory that all feeding of babies from milk depots should be under direct medical control. I had occasion also to show later the harm done by giving patients, or selling them, milk without physicians' prescriptions. When, some four years after the depot was started by me in my service, other milk depots arose in the effort to supply the poor with good milk, I found that some of my patients, after exhausting the supply obtained in my clinic, would go elsewhere, and buy, without control, additional feedings. Such children would, of course, become very ill from excess of food. This could not happen were the depots under strict medical control.

The good intended was in many cases thus overshadowed by the harm done. In any clinic for the treatment of infants and the feeding of the well and sick infants, there will always be a floating quantum of patients who drop out, but a certain percentage, as indicated, remain, especially if mothers see that the medical care is sincere, that the infant is watched and weighed. At this time, when complicated mixtures were prescribed I would, if I thought the mother was earnest, send a nurse to the house, especially if the mother could not spare time from her work, to teach her the making of the food and the details of care of the infant. I feel now, as I felt and agitated at this time, that the milk depot alone is of very limited utility if not combined with actual, not nominal, medical treatment of the infant. To-day we have also this idea of quite general adoption in foreign countries and America. The milk depot with actual medical supervision of infants has come to be generally adopted, and will in time attain greater perfection of method, and will reach more infants as mothers become more educated in the care of their infants. The ideal method is that which I have first adopted and practiced. The physician first sees the infant; if the baby is well, and at the breast, the breast-nursing and addition of bottle-feeding is advised, if the breast is not sufficient. If the breast is not available after an examination of the mother, then artificial feeding is given. If the infant is ill, it is first treated for the illness. An illness not involving the gastro-intestinal tract is rather aided to recovery by feeding properly. If the gastro-intestinal tract is involved, the physician first carefully guides the infant through severe illness to the proper food. This is the method, it seems to me, which should be introduced in all clinics. The first result of furnishing the proper food for the infants is to relieve the mother of an amount of time-consuming work; the next is to insure to the infants with mothers not so intelligent the proper food. The ultimate results show in decided reduction of morbidity, if not mortality.

President: "The next paper on the program is closely akin to the paper just read."

THE RELATION OF PURE MILK TO CHILD WELFARE ACTIVITIES.

By Henry L. K. Shaw, M.D., Director, Division of Child Hygiene, New York State Department of Health, Albany, New York.

There is a close and intimate relationship between pure milk and infant welfare activities. They are interdependent and inseparable, and the wider employment of either one automatically affects the other. The history of the development of infant welfare work shows that its very origin was associated with the problem of clean milk.

Neither the medical profession nor the public at large paid much attention to the subject of infant mortality until about twenty-five years ago. The vital statistics at that time showed a declining birth rate in practically all civilized countries, with a proportionately high infant death rate. Investigations into the causes of this infant mortality revealed the facts that the deaths were largely due to diseases of the intestinal tract, that there was a very large increase in the number of deaths in the summer months, and that almost all of these deaths were in artificially fed babies. The conclusion, therefore, was inevitable that the milk supply was at fault. Doctor Osler emphasized this point when he remarked to a patient who attributed to Providence the death of her bottle-fed baby from diarrhea, "Madam, God did not kill your baby—it was dirty milk."

Sporadic attempts have been made during the past fifty years in different localities to improve the milk supply from "pasture to pail, and from pail to palate," and the following description of a dairy supplying milk to New York City is taken from a book written in 1842 by one Hartley:

"If anyone is still skeptical as to the pernicious quality of the milk with which he is supplied, let him accompany his milkman to his dairy, and his doubts will be removed. If the wind is in the right quarter, he will smell the dairy a mile off: and on reaching it, his visual and nasal organs will, without any affectation of squeamishness, be so offended at the filth and effluvia which abounds, that still-slop milk will probably become the object of

his unutterable loathing the remainder of his life. His attention will probably be first drawn to a huge distillery, sending out its tartarian fumes, and blackened with age and smoke, casting the somber air all around. Contiguous thereto, he will see numerous low, flat pens in which many hundreds of cows, owned by different persons, are closely huddled together, amid confined air and the stench of their own excrements. He will also see the various appendages and troughs to conduct and receive the hot slush from the still and all within an area of a few hundred yards. He will discern, moreover, numerous slush-carts in waiting and in motion, for the supply of distant dairies; empty milk-wagons returning, and others with replenished cans as constantly departing. . . . This sketch, though drawn from actual observation, very inadequately represents one of the still-slop milk and whisky manufactories in the vicinity of New York.

"The dairies have been formed around the distilleries for the purpose of consuming on the spot the slop refuse of this extensive concern, which distills about one thousand bushels of grain daily. . . . The stalls are rented by the proprietor of the distilleries to the different cow owners, at from four to five dollars a year per each head of cattle, while the slop is furnished at nine cents a barrel. In the neighborhood of the distillery there are about one thousand eight hundred cow-stalls. . . .

"Slop constituting both food and drink, water and hay and fodder supply no part of the wants of these abused animals. . . . The stalls are three feet wide, with a partition between each and a ceiling about seven feet high overhead. But the chief and most inexcusable defects are the want of ventilation and cleanliness.

"For the space of nine months they are usually tied to the same spot, from which, if they live as long, they are not permitted to stir, excepting indeed they become so diseased as to be utterly useless for the dairy. They are in a word, never unloosed while they are retained as milkers. In some few cases the cattle have stood in the same stalls for fifteen or eighteen months; but so rapid is the progress of disease under this barbarous treatment that such instances are exceptions to the general rule and of very rare occurrence."

The medical profession was not aroused to the great importance of clean milk from sanitary dairies until 1892, when Dr. Coit, of the Newark Medical Milk Commission, launched the project of Certified Milk. This gave great emphasis to the clean milk agitation throughout the country, and the medical profession became leaders in educating and enlightening the public to the great importance of clean milk, especially for children. State Legislatures and municipalities, urged by the medical profession, took up the question of improving the milk supply, and to-day there is scarcely a city of any size which has not a milk ordinance, with inspectors who devote all their time to seeing that its provisions are carried out.

The reduction in the infant mortality in New York City in the past twenty-four years illustrates what can be done in saving lives of infants, and what has been accomplished in New York has to perhaps a lesser degree been done in many other cities throughout the United States:

The infant death rate was 288 per 1,000 living births in 1880.
" " " " " 168 " " " " "1902.
" " " " " 144 " " " " "1908.
" " " " " 120 " " " " "1911.
" " " " " 109 " " " " "1912.
" " " " " 101 " " " " "1913.

This reduction is the result of many factors, not the least of which were the improvement in the milk supply and the establishment of milk depots and infant welfare stations. The first effort to supply pure milk specially prepared for children was made by Dr. Koplik, and he is not given the credit which rightfully belongs to him. Several years after he started his milk depot in the Good Samaritan Dispensary, Dr. Budin, in Paris, started what he termed an "infant consultation." This was a place where mothers could bring their babies for advice.

Two years later, in 1894, Professor Variot opened a station in Paris where milk could be secured for infants whose mothers were not able to nurse them. These stations spread like wildfire through Europe, and to-day there are over five hundred of them in France, 547 in 345 different localities in Germany, 77 in Belgium (30 of which have been founded since 1910), 23 in Sweden, and

46 in Russia. The growth in this country has not been quite as rapid, but there has been a very large increase in the milk depots in the last five years.

Dr. Kerr, in a report written in 1909, could only find twenty-one States in the United States in which milk depots were located. In 1911 he obtained data concerning forty-three stations in thirty States.

Dr. Van Ingen, in an article which has just appeared on "Infant Welfare Work," has collected statistics of two hundred and four stations in thirty-nine cities and small towns of this country.

In New York State, outside of New York City, there were only twelve localities last summer in which the stations existed.

In the last three years there has been a decided change in the methods employed in these milk stations, and the situation to-day is the result of a process of evolution. As originally conceived by Dr. Variot, these were places where pure milk was to be dispensed at cost or free to the deserving poor. Very little or no effort was made to reach the mothers in the homes, and the scope of usefulness of these stations was very limited. To-day the question of educating the mothers is given much more emphasis. The necessity of clean milk is demonstrated, and in many stations it is furnished at a nominal sum. The necessity for breast milk is strongly emphasized, and the nurse, on her visits to the home, teaches the mother how to prepare the feedings. The nurse, having once gained admission to the home, is able to give practical demonstrations in the care of the baby—its bathing, sleeping, and clothing—as well as feeding the older children. It is found that much better results are obtained at much less cost by this method of home modification and instruction. The mother is taught how to care for the milk and how to use it. It is evident that pure milk, improperly used and improperly kept, can do an immense amount of harm. To quote from Dr. van Ingen:

"The milk station of to-day makes personal instruction of the mother by a physician and by the visiting nurse in the home the most important element without in any way denying the great importance of clean, pure milk for a baby's food when it is deprived of its natural source of nourishment."

Dr. Josephine Baker says that "pure milk, however desirable, will never alone solve the infant mortality problem."

Medical Milk Commissions are apt to feel that their responsibility ends when they set the seal of their official approval upon the milk from one or more dairies. There is no question but that the present pure milk movement received its impetus through the work of the Medical Milk Commission.

It seems to me that you are not doing enough educational work to-day. More energy should be placed into an educational campaign to increase the wider use, not alone of Certified Milk, but all pure milk from tuberculin-tested cattle, both by physicians and the public. There should be close co-operation between the Medical Milk Commission and those in charge of infant welfare stations, and, whenever possible, Certified Milk should be made available for the patrons of these stations.

Dr. Louis C. Ager, Brooklyn, New York: "I felt that in preparing this paper a title somewhat different from the one assigned me would more correctly present the idea I had in mind, and I have, therefore, changed the title of my paper to 'Pure Milk or Chemically Modified Milk in Infant Feeding:'"

PURE MILK OR CHEMICALLY MODIFIED MILK IN INFANT FEEDING.

By Louis C. Ager, M.D., Brooklyn, New York.

It is hoped that this title will immediately suggest to everyone present the question, Why should these two things be contrasted? In what possible way could there be any difference of opinion in regard to the value of both in infant feeding? Nevertheless, we must bear in mind the peculiar tendency of medical theories to swing from one extreme to another in the course of a generation, and to emphasize first one phase of the truth and then another, at the expense of the truth as a whole. In nothing has this been more pronounced than in the theories of infant feeding. The men with a purely chemical point of view have to a large extent ignored the question of milk infection, while many clinicians have

declared that the dilution or modification of clean, fresh milk is hardly necessary in infant feeding. In 1846, Klencke ascribed the danger of milk from tuberculous cows to the chemical changes—i. e., a decrease in casein, fat, and sugar, and an increase in albumen to as much as 15%, probably pus. In 1868, West, in his Diseases of Infancy and Childhood, said that a slight alteration of this kind must render the milk unfit for the nutriment of a delicate infant. A little later Biedert called attention to the chemical differences between human and cow's milk, and proved to the satisfaction of his generation that the "curd" was the dangerous element which must be modified for successful feeding. In this country Rotch was largely responsible for the adoption of Biedert's teaching, and for many years the high-fat-low-proteid food was in almost universal use. Perhaps the reduction *ad absurdum* to which this theory was reduced in one of our New York medical schools was partially responsible for the reaction against it. It is not many years since Holt and others pointed out the very serious danger of high fat feeding and the consequent fat intolerance, and now it has been necessary for Hess and Talbot to point out the very obvious fact that "curds is curds," and that the nutrition of an infant would undoubtedly be better if these foreign bodies were not allowed to form in the digestive tract.

None of these previous steps in the evolution of our knowledge of digestive processes has in this country delayed the equally important progress in the production of clean milk. Here again we are indebted to the pioneer work of Rotch, who was equally interested in both problems, as have been most of those who have followed him. That this country has made such excellent progress in the pure milk propaganda is also due to the strength of the conviction among clinicians that raw milk is essential to the highest state of nutrition, and that cooked milk is responsible for scorbutus and other forms of malnutrition. It has undoubtedly been fortunate for the nation that those who viewed this theory with a feeling of tolerant superiority have not been permitted to supervise the milk supply.

On the other hand, in England and on the Continent the almost universal custom of cooking milk for infant feeding has

tended to increase the prevalence of malnutrition and to minimize the danger of gastro-enteric infection. That is, the number of cases of malassimilation is greater and the number of cases of infection is less than would be the case if raw milk of average grade were used. The wet-nurse has also been an important factor in the situation. Although there have always been some men on the other side to emphasize the need of clean raw milk, they appear to have entertained the idea more or less as a theory. Professor Raudnitz, of Prague, says, "Pasteurization is a very poor substitute for proper cooling," and Camerer, of Stuttgart, says, "It is nearly certain that the sterilization of milk is of influence in the causation of scurvy." Neverthless, he advises his patients to boil milk from two to five minutes in winter and from five to ten minutes in summer. Undoubtedly conditions are better in London than they were nine years ago, but at that time Dr. Carpenter wrote to me in his characteristic style as follows:

"The care of milk? There is no care of milk; it just takes care of itself from the time it leaves the manure-begrimed hands of the milker, on its way to the railway station, by the train, dragged through the metropolitan streets to the milk depots, then in the milk carts to the large private house and the smaller milk shops, and finally to the consumer, who fetches it in person and who has as much knowledge of how to keep the filthy stuff as she has of taming a lion. The sanitary authorities do all they can to prevent adulteration, and for that they possess full powers, but they have no powers to compel clean collection and clean transit."

Fortunately, since that letter was written there has been a revision of the sanitary code as relating to the milk supply and, as we all know, much is being done all over Great Britain in the way of baby welfare work. Neverthless, Vincent's reports indicate that the milk is still the source of a considerable amount of gastro-intestinal disease.

Although this brief review of well-known facts may appear to be irrelevant, I believe they point to explain the latest radical tendency in infant feeding. For some reason the Finkelstein idea seems to have overshadowed everything else in Germany. This may be due to the proverbial fondness of the Teutonic mind for

complex methods of solving simple problems. Many of them are at present vying with each other in their efforts to prove that the age, source, previous condition, and bacterial content of the milk from which the Finkelstein complex is manufactured are of no practical importance. Some of the rumors are almost unfit for publication. From a strictly chemical point of view this idea may be quite true, but its promulgation will not help to secure a clean pure milk supply for those of us who may have a merely sentimental desire for it. It is equally true that, although the gelatin and fats produced at Barren Island have high food value, there is no great demand for them on the part of housekeepers, and the pure food laws are not likely to be modified to permit their sale.

Recently the Finkelstein school has gone a step farther in advising the use of casein milk in the routine feeding of healthy infants. In No. 12 of the Monatsschrift f. Kinderkrankheiten of last year, Heim and John report their experience in feeding forty-five healthy children in this way. They evidently took great pleasure in proclaiming that the children were all well-nourished after the experiment, but there is nothing to indicate that the babies would not have done quite as well on some simple modification of clean raw milk.

In this country less and less emphasis is being placed upon milk infection as a cause of digestive disturbances, particularly in our Northern and Western cities, in which the milk supply has been so markedly improved. The reports of Bowditch, from Boston, and Vincent, from London, have been received with polite skepticism in most instances, in spite of the very careful work recorded. The attitude of New York pediatrists has a decided influence upon the beliefs of the rest of the country, and there is a strong tendency among some of the younger men of that city to swallow whole whatever the followers of Finkelstein may promulgate.

If the American Association of Medical Milk Commissions is to perform its greatest use, it must meet this situation wisely and temperately. We must give no justification for the accusation of being called raw-food cranks or bacteria maniacs. We must ad-

mit fully whatever is true in regard to the safety of using ordinary grades of milk for the preparation of infant foods that are to be cooked in the process. We must lay great stress upon the fact that the selection of Certified Milk is only the first step in determining the proper food for the individual child. Milk Commissions serve the public in two ways: first, in producing a few quarts of Certified Milk for the small percentage of the population that will use it; the second and far more important use consists in setting a standard which shall not be impossible of attainment in the production of all milk to be used in infant feeding. Milk Commissions must advocate methods in all the processes of milk production which may be attained by conscientious effort without prohibitive initial expense in small communities, and they should encourage and not discourage the organization of neighboring Commissions whenever and wherever their establishment will improve the general milk supply, even if the highest standards cannot be enforced rigidly at the outset.

Dr. Arnold F. Furrer, Cleveland, Ohio, read the next paper, on "The Supervision and Control of Modified Milk by the Milk Commission of Cleveland."

THE SUPERVISION AND CONTROL OF MODIFIED MILK BY THE MILK COMMISSION OF CLEVELAND.

By Arnold F. Furrer, M.D., Cleveland, Ohio.

While the primary or chief function of Medical Milk Commissions is the supervision of the production and control of the highest grade of milk, known as "Certified Milk"—a milk especially intended for infant feeding—their influence in raising the standards of other grades of milk is not infrequently observed. "Inspected Milk" produced under the direction and controlled by Milk Commissions, while not subject to the rigid conditions required in the production of Certified Milk, is still a safe and clean milk and produced at a cost but slightly above that of the ordinary market grade.

A further extension of the original function of Medical Milk

Commissions is foreshadowed by the title of this paper, viz., "The Supervision and Control of Modified Milk."

Since the organization of the Cleveland Milk Commission, about ten years ago, the aim of that Commission has been the certification of a product of milk known as "Certified Milk," and that only.

Three years ago a request was made that it supervise an "inpected" grade as well, but, owing to some opposition from one or two members of the Commission at that time, the request was not granted. About the same time, however, the Walker-Gordon Laboratory was asked to use Certified Milk only in their milk modifications, which request was promptly and cheerfully complied with, and, as far as we know, the Walker-Gordon Laboratory of Cleveland was one of the first, if not the first, to use Certified Milk. At this time, however, the technique of this laboratory was not carried out under the supervision of the Milk Commission.

Last summer, after evidence had been adduced that serious contamination of the Modified Milk was occurring, a formal request was made to our Commission that it assume regular supervision and control of their laboratory.

With the co-operation of the secretary of the Board of Health and, through him, of the assistant city bacteriologist, a study of the conditions under which modified milk was being produced resulted in the discovering of the following sources of contamination:

1. Insufficient cleansing of various receptacles used in milk modifying.
2. Dusty caps being used.
3. Fly contamination where the cream was being separated.
4. Man in charge of modifying overworked. Hands and suits dirty because required to do dirty work and clean work at the same time.
5. Milk used for modifying coming from certified farm twenty miles away in ten-gallon cans, marked "bulk certified," unsealed.
6. Heavy bacterial content in the whey ingredient.

Having ascertained the various sources of contamination, abundantly confirmed by bacteriologic tests taken at every point, the laboratory at once made all necessary changes requested by our Commission's representative.

The Secretary and Assistant Secretary of the Milk Commission were then appointed a committee to draw up a contract of rules and standards for the modification of milk, and the latter was designated to represent the Commission on his visits of inspection, which are usually made at irregular intervals or at different hours. The following points are always noted:

1. The general appearance of men in the laboratory as regards health and cleanliness.

2. The general appearance of the laboratory is noted—cleanliness, neatness, ventilation, temperature.

3. Methods and technique observed in ordinary modifying and in the making of Eiweiss milk.

4. Inspection of bacteriologic records of "bulk certified," cream, skim milk, distilled water, whey, lime water, etc.

This laboratory is now modifying milk made from Certified Milk, and over a thousand bateriologic records reveal that the ingredients of the modified product are as free from contamination as the original Certified Milk from which it is made. Original records shown (courtesy of Belle-Vernon Mapes Dairy Company). The bacteriological work of the producer is controlled by the bacteriologist of the Commission, who at monthly intervals obtains a specimen of the mixture of the six ingredients entering into modified milk.

In conclusion, the Commission wish to express their appreciation of their producers' untiring efforts in maintaining the high standard set in the rules and standards drawn up by them.

The following interpolations occured during the reading:

I have here records of the bacteriological tests made on the different ingredients—nearly one thousand altogether—and I think I can show from these charts that the modified milk is practically of the same standard bacteriologically as Certified Milk. These charts reveal that the bacteriological standard attained is

practically as high as that of Certified Milk. The standard has been placed at ten thousand.

(Referring to chart.) You will see there are only three contaminations over a period of nearly one year, and these high counts were due to the fact that we ran short of Certified Milk and had to use the next best grade of milk. In March there were three contaminations, the highest count 55,000. Nineteen of the twenty-two counts were below 10,000. In April we had thirteen counts, and only one above 10,000. In May we had seventeen counts, with only one above 10,000. Of 32% cream, we have a record of about 40,000, and you will see the heavy line represents the standard required. At no time during the sixteen counts was there any approach to the 40,000 standard—all were below that. In February there were two slight contaminations, and again that was due to the milk we had to substitute for certified. In March we had at no time cream approaching 40,000; most of the time it was below 10,000. In April, one contamination, amounting to 75,000, and the rest under the 40,000 standard. In May, no contamination at all. In nineteen counts, most of them are below 10,000—a few between 10,000 and 15,000. Of skim milk, during January (the standard is 10,000) we note most of them are under 5,000. In February we had one contamination, 68,000—again because the milk used in the modifying was not of the certified standard. In March, sixteen counts show not one approaching 10,000; the majority are in the vicinity of 5,000. In April, about the same, counts being 5,000 to 10,000. May, we have nineteen counts and only two of them slightly above 10,000. Whey: It was found practicable to pasteurize the whey; we get counts between 5,000 and 10,000, and sometimes much lower than that. February shows no contamination; March, counts not averaging 5,000; May, the same. The sugar-water was also tested and is practically sterile, as well as distilled water. Before the Milk Commission took charge we took nineteen counts of the *cream, whey,* and *skim milk*. Eight counts of skim milk averaged 99,000. The average of the three ingredients was about 281,000. During January, after the Commission had taken up the supervision of the

milk, forty-six counts were made of the same ingredients, with an average of a little less than 5,000.

President: "Without bringing the matter before the Association, I have had all the papers of the convention presented, and we can now devote a little time to their discussion. I think the papers all relate to the general subject of clean milk."

Dr. Coit: "Being associated with Dr. Kerr on the Committee on Milk Station Statistics, I am familiar with his attempt to give the credit for its establishment in this country to whom it belongs. I am very glad that Doctor Koplik has come to his own this afternoon, and I am glad that the record of that history is to be placed upon our books.

"There has been some fault found with the distribution of the milk without medical supervision of the work, and the lack of this is the only thing I have against milk depots. Following my report as Chairman of New Jersey Medical Society's Milk Committee, in 1889-91, which was coincident with the organization of the Milk Commission, the New York Post had two editorials on the report. These editorials on pure milk in the New York Post led Mr. Strauss to be interested, and he furnished his secretary with money to finance a milk-station charity in New York. I was consulted by the secretary, Mr. Kinkead, with whom I carefully reviewed his plans to sell sterilized milk to the poor. He asked me to go to New York and help him organize his charity, but with the new Medical Milk Commission on my hands, I could not do so. I wrote to Dr. Rowland G. Freeman, introducing Mr. Strauss' secretary, and said, 'He is the man to help you; he will teach you how to pasteurize the milk.'

"Now that Dr. Koplik has had his opportunity to state where the milk station really had its origin, I want to say that Doctor Goler, of Rochester, must have the credit for the second one. Then it was not until 1894 that the Goutte de Lait was started in the south of France by Da Four, and it

was immediately duplicated in a maternity hospital under the control of Doctor Budin, in Paris.

"Dr. Shaw mentioned Hartley's work in 1842. Doctor Holt feels that the book is worth its weight in gold because of its historic relation to the doing away with the swill and dirty milk which was fed to New York in 1842. I have discovered in the transactions of the State Medical Society of New York for 1860 fifteen or twenty pages of a report on milk made by Doctor Parry, who was chairman of a committee to investigate milk conditions in New York. He nearly abandoned his personal interests to devote his whole time to this investigation. Young Dr. T. Gailard Thomas was associated with Doctor Parry on this milk committee."

President: "The first statute in the United States relating to milk was passed by the Tennessee Legislature in 1820, to prevent the use of milk from cows having milk sickness."

Dr. Coit: "In Berlin, in 1911, I was in the foyer of the Reichstag, where a reception was being held, and, being introduced to the 'czar' of pediatrics in Germany, Professor Hoekner, he said, pointing to Dr. Koplik, 'That is the man what found out something that nobody else ever knew.'"

Secretary: "Doctor Shaw called upon the Milk Commission to stimulate the movement, and laid upon them the burden of responsibility in the community. My interest is not in the limited supply of clean milk, but in the educational influence which the Milk Commission may have in the community. I think it follows that where a Milk Commission is efficient in a community it very promptly comes into the infant welfare and child welfare work. In Cincinnati it has been stimulated by the consideration of infant mortality and welfare work. We have a large system of stations, as well as our clinic work. Some rather definite advance has been made recently—at least a beginning—in the study of children after birth, which will attempt to close that hiatus which now exists between the child who has been carefully nurtured

by the infant feeder to the time he is taken care of by the school inspector. After he is two or three years old he is dropped until he is in school, then carefully watched for a period, and then again he is dropped. Recently we have groups of physicians who propose to study these children continuously and watch them, particularly the physically defective ones, and see whether by careful observation something cannot be done that we may know, when the child comes to school, what its history has been and what opportunity it presents for success in school work and what vocation should be given that child in order to make the best of his capabilities."

Dr. J. J. Thomas, Cleveland, Ohio: "Referring to what Doctor Shaw said, I will tell what the Commission has done in Cleveland. Certified Milk was first used in Cleveland in an infant asylum, in 1905, before it was put on the market, and has been used there ever since. The death rate at this institution had previously been as high as seventy-five per cent, but shortly after the introduction of Certified Milk our death rate dropped eighteen to twenty per cent. A great number of the deaths have been from congenital disease. This is one of the evidences of the work the Commission may do.

"Dr. Ager, it seems to me, has placed Finkelstein on a very much higher pinnacle in this country than he occupies abroad. I met him last year and he is a very fine gentleman, but his work does not occupy as high a position there as it is supposed to occupy in this country. I asked one of the assistants in Czerny's clinic over there what he thought of it, and he said, 'Finklestein changes his ideas every few days; we hardly know what to think of it.' He first attributed cholera infantum to salts, and was going to eliminate it by his casein milk, and afterwards he attributed it to something else, and so he changes his ideas frequently. In the largest clinic there they said they did not know what to think of Finkelstein. I spent some time in the institution of which he has charge, and they do not use Eiweiss Milk there exclusively at all, but simply as one of the foods they may use—simply

use it experimentally, as they have to use all these foods. Czerny attributes its value entirely to its high milk calcium content. Czerny exhibited a case of what Finkelstein calls his Intoxication; in four days the child became well on whey, practically confuting the claims of Finkelstein.

"It has been assumed, I think, that the only way to produce Certified Milk and deliver it to the consumer is to bottle it at the farm. There is a considerable feeling in Cleveland that Certified Milk costs too much—it is eighteen cents a quart, and that is not excessive. We find we cannot produce it profitably for less than eighteen cents to the consumer. The suburban company which brings in the milk from thirty miles away charges considerably more to carry the bottled milk than the same amount of milk would cost in bulk to carry into the city.

"The question comes up in my mind whether we might not possibly consider the bottling of this milk in the city instead of at the farm. I would not, of course, propose that without discussion, but the question suggests itself whether the price might not be lowered in that way. We would certainly get it at the laboratory for less, and the cost would not be increased by bottling it there."

President: "It will be necessary to terminate this discussion at the evening session, as the remainder of the program is a business meeting and for the election of officers."

EXECUTIVE SESSION.

The following is a summary of the transactions of the Executive Session:

The Secretary called the roll of the members and delegates present. This was accepted as the roster for the meeting.

After much debate, it was voted to dispense with the reading of the minutes of the previous meeting of the House of Delegates.

The nominations for officers for the ensuing year were then called for by the President. The Secretary read the report of the Council placing in nomination for President Dr. T. C. McCleave, of Berkeley, California. There were no other nominations, and, on motion, Dr. McCleave was elected on a ballot cast by the Secretary.

The Council nominated for Secretary, Dr. Otto P. Geier, of Cincinnati. Dr. Van Derslice nominated Dr. Black, of Chicago. Before the balloting took place the meeting adjourned until evening because of the illness of a member of the Chicago Commission.

THIRD SESSION.

Friday Evening, June 19, 1914.

The session was called to order at the Oak Hill Country Club, at 8:15 P. M., Doctor Kerr, President, in the chair.

The first on the program was the awarding of prizes in the contest for Certified and Market Milk. The Association annually holds a contest of this nature in conjunction with the United States Department of Agriculture, and this year the contest was of an especially interesting character, a silver loving cup being given as a first prize, donated by the National Association; and a second prize, by Messrs. Shanck, Dana, Markham, and Whitmore, also a silver loving cup—both for Certified Milk. Several prizes were also offered in the Market Milk contest by the Big Elm and Brighton Dairy Companies.

In the National contest the annual prize was won by H. P. Whitmore, of Avon, New York—97.9%; second prize, by W. P. Schanck, of Avon, New York—97.75%; third prize, Doctor Shaw, of Albany, New York—97.3%. Honorable mention was made of Markham & Puffer, of Avon, New York; H. P. Hood & Son, of Derry, New Hampshire; Vernon-Mapes Dairy, of Novelty, Ohio; M. W. Palmer, of Kingsley,

Pennsylvania; Hilltop Farm, of Wheeling, West Virginia, and the El Paso Dairy, of El Paso, Texas.

In the Market Milk contest the first prize was taken by George M. Tyler, of Honeoye Falls, New York, with a percentage of 97.45.

The Big Elm Dairy donated to its producers two prizes, the first being taken by J. W. Hopkins, of Pittsford, New York, and the second to W. H. Craig, of Rochester, New York.

The Brighton Place Dairy also gave two prizes to its producers, of which the first went to H. G. Day & Son, of Seneca Falls, New York, and the second to Hiram Sweezy, of Batavia, New York.

Honorable mention was made of O. E. Cole, of Honeoye Falls, New York; Frank O. Powers, of Victor, New York, and Henry B. King, of Canandaigua, New York.

Doctor Kerr, before announcing the results of the contest, said: "It is through the efforts of the local medical society that this milk contest has been conducted. As I understand, the milk furnished was all one day's production and shipped in at considerable expense by the Certified Milk producers. A large number of the dairymen supplying milk to the city of Rochester have also submitted samples, and there have been a number of prizes awarded. All the examinations of the milk have been carried on by an official of the Bureau of Animal Industry of the Department of Agriculture."

Mr. Ernest Kelly, of the Bureau of Animal Industry, read the results. Mr. Kelly said: "The sampling was all done by Mr. Cook, who had to leave before the meeting, so I am reading the scores that he made. I presume that you are all familiar with the manner in which these contests are conducted, so I will not take the time to explain them further. The milk is all produced on the same day, whether it was produced in Texas or in Rochester. The first arrivals are

kept in cold storage until the milk is all in. It is in absolutely the same condition when the counts are made. The Market Milk was two days old, and the Certified Milk seven days old when they were plated. Out of a hundred points we allow 35 for bacteria, 25 for flavor and odor, 10 for freedom from visible sediment, 10 for fat, 10 for solids not fat, 5 for acidity, and 5 for bottle and cap. Only two were perfect on bacteria. It is necessary to have a count of 400 per c. c., or less, and you can see how difficult it is to obtain it on milk one week old. The scores in this contest are remarkably good, especially those on the Certified Milk which has come a great distance. For some of the lower scores it was not sufficiently iced and warmed up on the long journey. In the Certified Milk contest a local producer seems to have cleaned up about everything there was to clean up. You can see we have nine samples that score over ninety—a remarkably fine showing considering the distance and the time of the year. In the Market Milk contest, seven producers were over ninety."

Mr. Tyler, in receiving his prize and the congratulations, said: "I hardly know what to say in thanks, except that I will try to merit the approval you have shown me."

Doctor Shaw, in receiving his prize, said: "I think, gentlemen, it is worth it; but I am sorry that my head farmer, who is heart and soul in this work, is not here to-night. If the truth must be told, I do not know how to milk a cow, and he is the one who really ought to have the prize. I shall give this prize to Mr. Brooks and tell him it was presented by the National Association of Certified Milk Producers, and I trust he will keep up the record which he has made. In his name I accept this and thank you."

President: "I very much regret that there are not present more of the producers whose milk samples received honorable mention. To my mind the many entries in the contest and the high rates attained as a result of the giving of these prizes have fully justified the holding of this meeting, and should

be an encouragement to the members of the Association and a stimulus to the pure milk movement."

THE RELATION OF BOVINE TUBERCULOSIS TO PUBLIC HEALTH—A REVIEW OF THE WORK OF THE PAST YEAR.

M. P. Ravenel, M.D., Professor of Bacteriology; Director, State Laboratory of Hygiene, the University of Wisconsin.

For several years past, at the request of Dr. Coit, I have been in the habit of giving a short review of the work done during the past year on the relation bovine tuberculosis bears to the human disease, and on the evidence of its transmissibility.

Practically all scientific men consider the question as having been definitely settled in favor of the view that the bovine disease is transmissible to human beings, and especially to children. The only thing that remains to be determined is the actual percentage of cases which are due to the bovine bacillus—in other words, the public health importance of the bovine disease.

In spite of the facts stated, one occasionally finds articles which oppose this view to a greater or less extent. During the past year an important article by Medin has appeared in the Arch. f. Kinderk., 1913. In this article the autopsy reports of 7,630 children who died during the first year of life at the Stockholm hospital from 1842 to 1911 are reviewed. Six hundred and twenty-three showed tuberculous lesions. Six showed lesions exclusively in the intestines and mesenteric glands. Three hundred and thirteen showed a more generalized condition, but lesions in the bronchial glands and lungs were considered the more advanced. In only two per cent does he consider that primary tuberculosis of the intestine was present, and from the autopsy reports concludes that in ninety-eight per cent of the cases the infection was primary in, and occurred through, the respiratory tract. In thirty years' experience he says that he has never seen a case of tuberculosis which he could ascribe to infection through milk.

This paper is quoted for the purpose of warning against this

sort of testimony. Bacteriological examinations, wherever done, have shown the impossibility of detecting bovine tuberculosis clinically. It is probably impossible to determine the portal of entrance by what are considered postmortem the oldest lesions. It has been further shown that the tubercle bacillus can penetrate the mucous membrane of the intestine and reach the lung without causing a lesion at the point of entrance. This report by Medin has only an indirect, though important, bearing on the subject matter. It illustrates the kind of reasoning which has led to so much error on this question in the past.

The most important piece of work of the year concerning the infection of children by the bovine tubercle bacillus is that by Dr. A. Philip Mitchell, published in the British Medical Journal, January 17, 1914. Dr. Mitchell examined the cervical glands of seventy-two children under twelve years of age. Of these, thirty-eight resided in Edinburgh, and thirty-four came from neighboring country districts within a radius of twenty miles. The following results were obtained:

Age.	Human.	Bovine.	Total.
0– 1	2	1	3
1– 2	0	16	16
2– 3	0	8	8
3– 4	1	10	11
4– 5	0	4	4
5– 6	1	4	5
6– 7	0	5	5
7– 8	0	5	5
8– 9	0	5	5
9–10	1	4	5
10–12	2	3	5
Total,	7	65	72

The summary is as follows:

5–12 years.....Human, 4; Bovine, 30.
0– 5 " .....Human, 3; Bovine, 35.

Eighty-four per cent of the cases two years old and under were fed on unsterilized cow's milk.

This demonstrates in a striking manner what has been shown before, namely, that in addition to the deaths caused in children by the bovine tubercle bacillus, a very large percentage of the tu-

berculous deformities also come from the same source. There is little question that some of these cases at least go on to a fatal ending.

The President then asked the pleasure of the meeting as to whether they wished to finish the papers and have the discussion afterwards, or continue the discussion at this time.

It was decided to listen to the papers first.

The next paper was that of Dr. W. H. Park, of New York, on "The Amount of Return Tuberculosis in Certified Herds," but a telegram having been received during the afternoon stating that Dr. Park was unable at the last moment to get away to attend the convention, but had sent his contribution, and the paper not having been received, it was read by title only.

THE RESULTS OF TESTS OF HERDS UNDER NEW YORK COUNTY MILK COMMISSION.

William H. Park, M.D., New York, N. Y.

Although the Milk Commission of the Medical Society of the County of New York was appointed in 1901 and nine farms were certified that year, the tuberculin test was not required until 1904, because of the uncertainty in regard to the communicability of the infection to humans.

In 1904, the Commissioner of Agriculture, Mr. C. A. Wieting, took an interest in the work of the Milk Commission, and in order to assist us in our work, assigned a veterinarian to make the tuberculin tests in the herds at the expense of that department.

The Department of Agriculture had a law allowing it to enter a herd and test if it was considered desirable for the health of the community, and when the farms began to desire the test in order to be certified, the department was glad to aid in the matter.

As Dr. H. D. Gill, a State veterinarian, was known to members of the Milk Commission as a careful worker, and as he had done a great deal more work with the tuberculin test than others at that

time, Mr. Wieting assigned him to do the work for the Milk Commission.

When a small number of cows was to be admitted to the herd on test, although at first some were allowed to be in the herd for a time without test, the local veterinarian or the nearest State veterinarian would be assigned to make the test.

As time went on and the results of the tests became known, it was seen that it was very undesirable to allow any in the herd without testing, and even then many would be found to react on the next test.

Dr. Gill proceeded with the tests, assigned in most cases by the State until 1908, when the then commissioner, R. E. Pearson, decided that he could not assign a veterinarian outside of his district.

Because of that restriction, a number of veterinarians made the tests, usually of farms near them.

This resulted in a little confusion, and some retests were ordered.

Finally, in the early part of 1911, the Department of Agriculture decided that no more tests of herds which they had tested once could be tested free.

That made it necessary to arrange with the herds to have the test made by us, and as it seems much better to have one veterinarian make the tests, we have engaged Dr. Gill to do that work since 1911. The inspector for the Milk Commission, Mrs. C. H. Cocke, is present at all tests.

Thirty-eight farms are included in those whose tests are recorded in the lists given.

Six of those whose tests began in 1904-1906 are still in the list of certified farms, and two others now certified began in the time between September, 1906, and September, 1907.

Two farms were dropped from the list because the owners refused to remove the reacting cows; when the test was made there was no law compelling the removal of the cows.

We have found it advisable, in fact, necessary, to remove all cows which have a temperature curve, although it may be slight, in order to keep a clean herd.

SUMMARY OF ALL THE COWS.

	Reactors.													Remarks.
	No. of Herds.	No. of Cows	In Tested Herd.		Bought on Test.		Bought, no Test.		Calves raising, no Test.		Whole No. Reactors.		Average No. Cows in Herd.	
			No.	%	No.	%	No.	%	No.	%	No.	%		
My 1904–S 1906	18	1579	20	18.00	148	33.40	326	31.80	....	.....	494	31.28	87.7	
S 1906–S 1907	18	1081	38	21.35	52	13.65	86	16.47	....	.....	176	16.28	59.5	
S 1907–S 1908	15	1025	70	11.45	30	34.43	107	32.72	....	.....	207	20.19	68.3	
S 1908–S 1909	16	1180	50	5.64	6	8.66	39	17.48	....	.....	95	8.05	73.7	
S 1909–S 1910	15	1298	109	14.15	61	21.94	53	30.56	2	2.29	225	17.34	86.5	
S 1910–S 1911	18	1340	42	6.36	42	9.95	110	53.66	....	.....	194	14.48	72.2	
S 1911–S 1912	22	1810	41	4.27	39	6.08	53	42.74	31	14.25	164	9.06	82.3	
S 1912–S 1913	22	2256	35	2.49	47	9.00	40	44.53	16	6.66	138	6.09	104.6	2 herds had no reactors, 4 none but new.
S 1913–Je 1914	22	2210	49	3.34	42	9.29	10	7.57	13	8.06	114	4.25	100.4	In 1913-14, 9 herds had no reactors.
Total.....	....	13,779												

There still remain two herds to have their annual test, and one which has a semi-annual test, on account of having put in a large number of cows on test from various places.

	No. of Cows.	No. of Temps.	Average Initial Non-reactors.	Average Initial Reactors.	Average Initial Suspicious.
	1837	4626	101.0	....	....
1907.....	701	1760	....	101.2	....
	130	406	....	....	101.4

We refuse to admit to the herd cows bought on test if they have a rise of temperature in a curve, even although it may not go much over 102°, as we have had many reactions on the next test from such cows. There is so much opportunity for cows which have once reacted to be put into another test shortly and give only a slight reaction. Part of the larger percentage of reactions in the last item of the summary is due to such cows placed in a herd to enlarge it.

The figures in the table have been compiled by Mrs. Cocke from copies of the original charts of the tests, and are accurate.

Dr. T. C. McCleave, of Berkeley, California, then presented extracts from a paper which he had prepared for the Pediatric Section of the American Medical Association—"The Present Conception of Bovine to Human Tuberculosis." This article has been published in the American Journal of Diseases of Children. In this paper Dr. McCleave gives an epitome of the work that has been done on the subject of bovine tuberculosis and its relation to disease in the human. He quoted at length from the studies of Koch, Park, and Ravenel.

In conclusion, Dr. McCleave stated that the problem of ridding dairy herds of tuberculosis is so vast and so tremendous that its solution is far in the future. "There is no infection that can so easily be prevented as the bovine infection of children. All that is necessary is to heat the milk in the home—the entire solution lies in the heating of the milk in the home. If this is done it will never give children tuberculosis, and it is our duty to see that unless absolutely no milk comes from herds not tubercular-free, that it is heated to a degree which will positively kill the bacilli, and it should be a reproach to any community in which this is not observed."

President: "The three papers read have related to tubercular matters specifically, and we will now have a discussion on the subject. The subject of tuberculosis is so intimately associated with that of infant welfare work that, as the dis-

cussion this afternoon was not as long as we hoped it might be, we have some time to give to the subject, and I would like to call on Doctor Koplik to open the discussion."

Dr. Koplik: "It is a great honor you have done me in asking me to open this discussion. It is a very important subject, both for the layman and for the physician.

"In reply to the accusation that the New York medical men do not appreciate the greatness of the question of bovine tuberculosis, I will say we all grant that such cases occur in children. We all know that milk from tuberculous cows is sold, and I think most of us have seen such cases. On the other hand, I think we have not yet arrived at the point where we can say absolutely the relative frequency of this form of tuberculosis in children. One speaker gives a large percentage; another could not have a much smaller percentage. It shows that the subject is still being threshed out, and it is an important problem.

"The principal point seems to be that tuberculous milk is dangerous, and the second point is that tuberculosis from milk does occur, and to a certain extent in children, as the result of the existence of bovine tubercular bacilli in milk. We all grant they are passed through the walls and the tissues of the gut into the lymphatics, and, in fact, Baumgarten twenty years ago insisted upon such a form of infection; it is nothing new—it is now clothed with new interest. The investigation by autopsy or clinical examination is fruitless. In the last International Congress I showed that the frequency of tuberculosis in children varied in different countries, and in England the frequency is much greater than in America. It must be that in England the sources of infection are more frequent than in America. Therefore, investigation as to the class of bacilli would be apt to show a greater frequency of intestinal tuberculosis in England or Scotland than in America.

Certain forms of tuberculosis are more frequently in children than in adults. Is it simply an accident that children

develop one kind of tuberculosis and the adult develops pulmonary? The laboratory has proven the opposite. If guinea-pigs are given a small dose of bacilli, they will develop tuberculosis very much like children and recover. After these pigs have recovered, if they are reinoculated they will develop tuberculosis similar to that found in the adult subject—pulmonary tuberculosis.

"Hamburger and his school, and experimenters before him, explained the frequency of this form of tuberculosis (glandular tuberculosis) in children as due to the repeated inoculation of tuberbular bacilli in the young subject previously free from tuberculosis. Children very rarely develop the pulmonary type, but the great majority of children develop glandular and bone tuberculosis. If later in life these same children are exposed to tubercular infection, they develop the adult types. It is not important for us to have statistics concerning this, but we must recognize the fact that bovine tuberculosis does occur in young children, and is a fact to be reckoned with, and is not a negligible quantity. I have two cases which show this very plainly. One, a baby—a circumcised baby. It was a year old at the time I saw it. It developed tuberculosis due to tubercular infection of the wound. Instead of developing pulmonary or miliary tuberculosis, it developed a glandular tuberculosis, from which it recovered. I have another case, a child that had taken milk from a herd that was proven to be tubercular. He is now three years old, has intestinal and glandular tuberculosis, but he has nothing as yet in the lungs. This child is also getting well, and it is a bovine case, showing inoculation in a subject previously free with bovine tuberculosis.

"Now, if our experiments and hypotheses are correct, if any such children are exposed to a new infection of tuberculosis they have a sensitiveness that will result in the regular type of adult tuberculosis."

Dr. Ager: "I invariably instruct my patients to pasteurize all milk whenever they live in the city and cannot get a safe milk supply; but I do think there is a certain danger in an

organization of this kind laying too much stress on the question of bovine infection. It is a very small percentage of the tuberculosis which we see in our routine work, at least in New York and Brooklyn, and we ought to keep our minds on the work of prevention from contact with tuberculous patients. Those of us who examine children day after day—children of tuberculous parents and from tenements in which we know there are tuberculosis cases—realize that that is the problem which we must fight, at least in New York City, and we have not a great deal of energy to put into other forms of prevention until we get that question more or less mastered.

"Of course, the milk supply of New York City is being nearly all pasteurized at present, and very soon more will be pasteurized. We have only heard one side of this question of tuberculous lesion infection through the intestinal tract. The work of Ghon had not been mentioned until this evening. At least ninety-four per cent of the cases he examined showed infection in the lung, and all were cases in children and by inhalation. The human infection is what we need to continue fighting in this country at present."

Dr. M. L. Holm: "In the past it has been generally accepted that tuberculosis was essentially an inhalation disease. Modern bacteriology, however, has shown numerous objections to such a theory. Tubercle bacilli are widely distributed in nature. If inhaled with dust, they will be largely arrested in the nose and pharynx. From here they may be swallowed with the saliva, as are other bacteria present in or on things swallowed. It is safe to estimate that the average individual swallows more bacteria in a day than he inhales into the lung in a lifetime. That tuberculosis of the lungs, as well as tuberculosis of other parts of the body, may result from ingesting tubercle bacilli cannot be questioned, but while bovine bacilli have been shown to cause many cases of tuberculosis in humans, this type of tubercle bacilli does not appear to be directly responsible for many human cases of tuberculosis of the pulmonary type. Recent investigations tend to indicate that

repeated infections with tubercle bacilli in small quantities are more likely to start active tuberculosis than are single infections with larger quantities, indicating that repeated small infections hypersensitize the host and increase his susceptibility. If this be true, then the relationship between the human and the bovine types of tuberculosis is such that sensitization may readily be produced by the bovine bacilli, to be followed later by infection with the human bacilli; whereas, without such previous sensitization, the human bacilli may not have become active. In this way the use of tuberculous milk may be an important factor in producing cases of tuberculosis in human subjects other than those lesions showing the bovine bacillus."

Dr. McCleave: "I was interested in what Doctor Ager had to say as illustrating the point I made about the attitude of physicians in this matter of bovine tuberculosis. Some seem to feel that you are diverting attention from what we all admit to be the main subject. One man said he believed more than twenty-five per cent of the cases in young children were due to bovine infection. When you compare that with the total number, it is self-evident that the amount of human infection is extremely serious; but why should any one think that, because we ask them to pay some attention to bovine tuberculosis and endeavor to combat this particular form, it is asking them to divert their attention from the human form of the disease?

"I do not think there is a man alive who can clinically diagnose the human from the other kind of tuberculosis. As a matter of fact, when you come to study the characteristics of bacilli from any given source by the ordinary bacteriological method, you cannot prove anything whatever. We know that at times the human type of bacillus will occur so closely and appear so nearly identical with the bovine type that those methods are not conclusive. The only way to determine type is by inoculation. The bovine type affects cattle and rabbits readily, and the human type with difficulty. So when you get down to the clinical method, it is worthless."

Dr. Ravenel (closing the discussion): "Jacobi says, 'It is of more importance to save the lives of babies than the reputation of one great bacteriologist.' One worker has said that all human tuberculosis in children is endemic, that all of us get our dose as babies, from the cattle, and subsequently, when we inhale either the bovine or the human type, that these bacilli are agglutinated and, instead of being gotten rid of, they stick together and give us our infection.

"It was pointed out years ago that bacilli cannot penetrate the unbroken mucous membranes. You must have a lesion at the point of entrance. The direct route is from the intestine to the lung, up the throacic duct. The proper place to look for the lesion is in the lung. All of our food passes through the thoracic duct and is poured into the circulation by means of the heart. But that has all been worked out by Van Steinberg and his co-workers. Wherever it has been studied in Germany it has been shown that the percentage of bovine tuberculosis runs from nineteen to twenty-seven per cent, and even in Berlin the percentage is found to vary according to the clientele of the hospital."

Dr. H. L. Coit, Newark, New Jersey, read a paper on "An Efficiency Score Card for the Use of Medical Milk Commissions, Based Upon the Code of Methods and Standards Adopted by the American Association of Medical Milk Commissions:"

AN EFFICIENCY SCORE CARD FOR THE USE OF THE MEDICAL MILK COMMISSION.

Based on the Code of Methods and Standards adopted by the American Association of Medical Milk Commissions and the author's estimate of the relative value of the several factors in the system represented by dairy hygiene, veterinary supervision of the animals, chemical and bacteriological investigations, and medical inspection of employees.

By Henry L. Coit, M.D.

"Efficiency" is the new international word. It is the slogan of every factory, every business, every department of government

and of the conduct of every religious and philanthropic organization.

With every form of efficiency which can be demonstrated there is a corollary of human limitation, and is expressed in and bounded by the lines within which any piece of work may be immune to criticism and be completely finished.

This is why I believe that the work of the Medical Society Milk Commission, which, like all other human agencies, has its limitations for efficiency and should confine its work to the important object of bringing to the nursery, the sick-room, and the hospital milk which will meet the requirements of the physician.

The objects of these federated Commissions were to study and improve the plan for obtaining milk for clinical purposes, "Certified Milk," to harmonize and extend the work of existing Commissions, and to promote the growth of the idea by encouraging the formation of new Commissions.

The design was not to lower the original standards set by the early workers in the field, but to harmonize and unify the work of all Commissions and square their work with the principles of the plan.

The purpose of the federation should be to uphold these principles, maintain the integrity of the plan, strengthen the system by raising the standards to the highest possible level consistent with the most exacting requirements of milk.

This can be accomplished only by absolute unanimity in the work of this Association, with no diminution of the spirit of idealism which actuated the founders of the Association.

This Association is a heterogeneous union of Medical Milk Commissions with dissimilar requirements and standards, ranging from the level which to some would seem prohibitive down through all degrees of efficient and inefficient supervision and control, to a few Commissions who lend their professional reputation to the certification of milk, but which are actually perpetrating a fraud upon the public.

From this state we should without delay emerge a concrete body working for one main object, namely: the attainment of the greatest degree of efficiency in the work of the Milk Commission,

each requiring the highest possible levels of purity, quality, and safety in the milk certified, consistent with the greatest practical advance in dairy husbandry and hygienic, chemical, biological, and prophylactic science.

If this cannot be accomplished through the present organization, something is wrong either with the leaders or with the rank and file.

There were fixed standards for Certified Milk when the plan was presented to the medical profession in 1890. There were specified requirements imposed upon the producer of Certified Milk when the first contract was entered into by a Medical Milk Commission and a milk producer in 1893.

Certified Milk was expressly designed for medical purposes and, therefore, must fulfill standards of well-balanced food values, of quality, of purity, and of clinical safety. These must needs be fixed in requirements imposed by physicians, for whose professional work it is designed and produced.

The methods for the attainment of these standards and requirements must be based upon the combined knowledge and experience of the physician and the producer of the milk, and it is only by the combined knowledge of both these parties that working methods for the production of this grade of milk can be determined.

Ever since the first standard requirements and methods were published, various persons and associations of persons have suggested other standards and methods for Certified Milk. These have varied in character from those so low that they were below the levels of much of the market milk, to those so high that it was impracticable and impossible to attain them.

These suggestions have come from physicians, dairymen, health authorities (both municipal and Federal), professional sanitarians, research laboratories, local and National Milk Commissions.

Methods and standards, including those originally fixed with an enlarged range and with definite specifications, were published by this Association following close upon its organization in 1906.

This manual was incomplete, but was used as a guide together with the extensive pamphlet and reprint literature of the Association and its members.

The Association from the first has had a Committee on Standards in each department of the work of Certified Milk production. These committees, headed by such men as the late Prof. Leonard Pearson, Dr. William H. Park, and Prof. Milton J. Rosenau, studied the questions and submitted reports from time to time to the Association.

In Philadelphia, at the fifth annual meeting, in May, 1911, the Association appointed a special committee to prepare a comprehensive code of standards and requirements for the production and distribution of Certified Milk. This committee consulted all authorities and sought information from every source—local, national, international—and, after calling in conference representatives of the Certified Milk producers and incorporating many suggestions by members of the producers' association, submitted its report, which was adopted at Louisville in May, 1912, as the standards and requirements of this Association for the production and distribution of Certified Milk.

The continued dissimilarity of the work of the Medical Milk Commissions in the United States, and the lack of universal agreement on methods and standards, is a serious embarrassment and menace to the cause of Certified Milk. Let me attempt to show wherein this dissimilarity could be transformed into unity, solidarity, and efficiency.

The following score card is a checking system, by the use of which the Commission may score itself and the dairyman and determine the efficiency of all branches of its work.

The basis for a score card must be the requirements, both mandatory and recommendatory, of the Association's code of methods and standards, and the value of the factors must be based on a correct estimate of the principles of the system of clinical milk production and their relative importance from the standpoint of the physician.

CERTIFIED MILK SCORE CARD.

This score card is to be marked only with maximum values (no intermediate values are allowed). A perfect score would show the practical fulfillment of every requirement of the code.

The factor values are based on the principles of the system and the geometric efficiency scheme by the author of the plan.

	MAXIMUM SCORE.				SCORE ONLY MAX. OR NEG.			
	1	2	3	4	1	2	3	4
	Dairy Hygiene	Veterinary Supervision	Chemical and Bact. Investig'n	Medical Exam. of Employees	Dairy Hygiene	Veterinary Supervision	Chemical and Bact. Investig'n	Medical Exam. of Employees
ORGANIZATION OF MEDICAL MILK COMMISSION.								
98. Medical society appointment and auspices. Conforms to standards of the Association of Medical Milk Commissions.	....	....	....	25	....	....	....	....
99. Commission includes at least five members carrying on the following divisions of work: (a) Hygiene of the dairy; (b) Veterinary supervision of the herd; (c) Medical supervision of the employees; (d) Chemical and bacteriological examinations of the milk	....	....	....	50	....	....	....	....
100. Employment of a veterinarian, a physician, a chemist, and a bacteriologist to enforce methods and standards. Written agreement with the dairyman whose plant shows it to be properly equipped for Certified Milk production	....	....	....	25	....	....	....	....
HYGIENE OF THE DAIRY.								
1. PASTURES OR PADDOCKS.—Free from marshes or stagnant pools, crossed by no contaminated stream, no offensive conditions, free from deleterious plants	....	10	....	....	....	....	....	....
2. SURROUNDINGS OF BUILDINGS.—Clean and free from dirt, rubbish, vegetable or animal waste, well drained	10	....	....	....	....	....	....	....
3. LOCATION OF BUILDINGS.—To insure proper shelter of stock, good drainage, sufficient distance from dusty roads and fields, and other sources of contamination	....	10	....	....	....	....	....	....
4. CONSTRUCTION OF STABLES.—To facilitate the prompt and easy removal of waste. Floors and platforms non-absorbent material, gutters of cement. Floors properly graded and drained, manure gutters six to eight inches deep, and placed to receive droppings	....	10	....	....	....	....	....	....
5. Walls and surfaces smooth, tight joints, capable of shedding water. Ceiling smooth and dust-tight	....	5	....	....	....	....	....	....
6. DRINKING AND FEED TROUGHS.—Drinking troughs or basins drained and cleaned; feed troughs and mixing floors clean and sanitary	....	5	....	....	....	....	....	....
7. STANCHIONS.—Stanchions of iron pipes or hardwood; devices to prevent the cows from lying down between cleaning and milking	....	5	....	....	....	....	....	....
8. VENTILATION.—Stables with adequate ventilation, each cow with at least 600 cubic feet of air space	....	10	....	....	....	....	....	....
9. WINDOWS.—Windows provide satisfactory light and sunshine; 2 feet square of window area to each 600 cubic feet of air space. Windows free from dust and dirt	....	10	....	....	....	....	....	....
10. Exclusion of flies and other insects, rats and other vermin from all buildings	....	....	5	....	....	....	....	....
11. Exclusion of other animals or fowls from contact with the certified herd	....	5	....	....	....	....	....	....
TOTAL	10	70	5	100	....	....	....	....

	MAXIMUM SCORE.				SCORE ONLY MAX. OR NEG.			
	1	2	3	4	1	2	3	4
	Dairy Hygiene	Veterinary Supervision	Chemical and Bact. Investig'n	Medical Exam. of Employees	Dairy Hygiene	Veterinary Supervision	Chemical and Bact. Investig'n	Medical Exam. of Employees
12. BEDDING.—No bedding from horse stalls, or unclean materials. Bedding clean, dry, and absorbent	....	....	5	....	....	....	....	....
13. CLEANING STABLE AND DISPOSAL OF MANURE.—Soiled bedding and manure removed at least twice daily, floors swept and free from refuse. Manure removed to field or stored and screened to exclude flies. Manure not even temporarily stored within 300 feet of barn or building	....	....	10	....	....	....	....	....
14. CLEANING OF COWS.—Each cow groomed daily; no sollings remain upon her during milking	....	....	5	....	....	....	....	....
15. CLIPPINGS.—Long hairs clipped from udder and flanks and from tail above brush. Hair on tail cut so the brush is well above the ground	....	....	5	....	....	....	....	....
16. CLEANING OF UDDERS.—Udders and teats cleaned before milking; washed with cloth and water, dry wiped with another clean, sterile cloth, separate cloth for drying each	....	....	5	....	....	....	....	....
17. FEEDING.—Foodstuffs kept separate from cow-barn. Brought into barn immediately before feeding	....	....	5	....	....	....	....	....
18. Foods fresh, clean, palatable, and nutritious	....	5	....	....	....	....	....	....
19. Well-balanced ration, changes of food made slowly	....	5	....	....	....	....	....	....
20. EXERCISE.—Cows out for exercise at least 2 hours in each 24, in suitable weather. Exercise yards free from manure and other filth	....	5	....	....	....	....	....	....
21. WASHING OF HANDS.—Facilities for milkers to wash before and during milking	10	....	....	....	....	....	....	....
22. Hands of milkers washed with soap, water, and brush, and dried on clean towel immediately before milking. Hands of milkers rinsed with clean water and carefully dried before milking each cow. No moistening of hands with milk	10	....	....	....	....	....	....	....
23. MILKING CLOTHES.—Clean overalls, jumper, and cap worn. Washed and sterilized each day, used for no other purpose; when not used, kept in a clean place	10	....	....	....	....	....	....	....
24, 31. MILKERS.—While at work, or persons handling the milk, use no tobacco nor intoxicating liquors. Hands and fingers kept away from nose and mouth	....	....	5	....	....	....	....	....
25. During milking, milkers do not touch anything but the clean top of milking stool, the milk-pail, and cow's teats	....	....	5	....	....	....	....	....
26. Milkers do not spit upon walls or floors of stables or milk-houses, or into water used for cooling milk or washing utensils	....	....	5	....	....	....	....	....
27. FORE MILK.—First streams from each teat rejected and collected into separate vessel. Milking done quietly and cows treated kindly	....	....	5	....	....	....	....	....
28. MILK AND CALVING PERIOD.—Milk from all cows excluded 45 days before and 7 days after parturition	....	....	5	....	....	....	....	....
29. BLOODY AND STRING MILK.—Bloody and stringy milk rejected, and such cow isolated from the herd	....	....	5	....	....	....	....	....
30. MAKE-UP OF HERD.—No cow besides the certified herd kept in the same barn or brought in contact with them	....	10	....	....	....	....	....	....
32. STRAINING AND STRAINERS.—Milk promptly removed from stable to clean room and emptied from pail to can, strained through double layer of cheese-cloth or absorbent cotton sterilized	10	....	....	....	....	....	....	....
33. DAIRY BUILDING.—Dairy building provided at proper distance from stable, dwelling, hogpen, privy, or manure pile.	10	....	....	....	....	....	....	....
34. Dairy building kept clean, not be used for purposes other than handling and storing of milk and milk utensils. Floors graded and water-tight	10	....	....	....	....	....	....	....
TOTAL	60	25	65	....	....	....	....	....

	MAXIMUM SCORE.				SCORE ONLY MAX. OR NEG.			
	1	2	3	4	1	2	3	4
	Dairy Hygiene	Veterinary Supervision	Chemical and Bact. Investig'n	Medical Exam. of Employees	Dairy Hygiene	Veterinary Supervision	Chemical and Bact. Investig'n	Medical Exam. of Employees
35. Dairy building well lighted, screened, and drained. No animals allowed therein. No part used for dwelling or lodging purposes, bottling-room used for no other purpose. This room entered only by persons employed therein, and kept scrupulously clean	10	....	....	....	....	....	....	....
36. TEMPERATURE OF MILK.—Milk cooled to 45° F. Aerators protected from flies, dust, and odors. Milk cooled immediately after being milked, is maintained between 35° and 45° F. until delivered	....	....	5	....	....	....	....	....
37. SEALING OF BOTTLES.—Milk is sealed in a manner satisfactory to Commission	....	....	5	....	....	....	....	....
38. CLEANING AND STERILIZING OF BOTTLES.—Dairy building provided with approved apparatus for cleansing and sterilizing bottles and utensils. Bottles and utensils thoroughly cleaned, rinsed until the cleaning water is thoroughly removed, exposed to live steam or boiling water at least 20 minutes, and kept inverted until used, free from dust	10	....	....	....	....	....	....	....
39. UTENSILS.—Utensils are constructed to be easily cleaned. Milk pails have opening 5 by 7 inches in diameter, made of heavy, seamless tin. All utensils kept in good repair	10	....	....	....	....	....	....	....
40. WATER SUPPLY.—Water supply free from contamination, sufficient for all dairy purposes, protected against flood surface drainage, and is conveniently situated	....	....	10	....	....	....	....	....
41. PRIVIES, ETC., IN RELATION TO WATER SUPPLY.—Privies, pigpens, manure piles, and other possible sources of contamination are situated on the farm to render impossible the contamination of the water supply, are protected by screens and other measures to prevent flies	....	....	10	....	....	....	....	....
42. TOILET ROOMS.—Toilets for milkers are located outside of the stable and milk-house, are properly screened, kept clean, with wash basins, water, nail-brush, soap and towels. Milkers required to wash and dry their hands on leaving toilet.	....	....	....	30	....	....	....	....
TRANSPORTATION.								
43. In transit milk packages are kept free from dust and dirt. Wagons, trays, and crates kept scrupulously clean. No bottles collected from houses in which communicable diseases prevail, but are taken under prescribed rules	....	....	10	....	....	....	....	....
44. Certified milk reaches the consumer within 30 hours after milking	....	....	10	....	....	....	....	....
VETERINARY SUPERVISION OF THE HERD.								
45. TUBERCULIN TEST.—Proper application of the tuberculin test. Applied in accordance with the rules and regulations of the United States Government, and all reactors removed from the farm	....	10	....	....	....	....	....	....
46. New animals are admitted to the herd after first having passed a tuberculin test, made in accordance with United States Government rules, tuberculin applied by official veterinarian	....	10	....	....	....	....	....	....
47. Immediately following the tuberculin test, the cow-stables and exercising yards are disinfected in accordance with the rules of the United States Government	....	10	....	....	....	....	....	....
48. A second tuberculin test follows each primary test after six months, is applied in accordance with the rules and regulations mentioned. Thereafter tuberculin tests are reapplied annually	....	10	....	....	....	....	....	....
TOTAL	30	40	50	30	....	....	....	....

	MAXIMUM SCORE.				SCORE ONLY MAX. OR NEG.			
	1	2	3	4	1	2	3	4
	Dairy Hygiene.	Veterinary Supervision.	Chemical and Bact. Investig'n	Medical Exam. of Employees	Dairy Hygiene.	Veterinary Supervision.	Chemical and Bact. Investig'n	Medical Exam. of Employees
49. IDENTIFICATION OF COWS.—Each animal in the certified herds is tagged with a number for permanent identification.	....	10	....	....	....	....	....	....
50. HERD-BOOK RECORD.—Each cow in the herd is registered in a herd-book, is accurately kept as to entrance and departure and tuberculin testing	....	10	....	....	....	....	....	....
51. Copy of this record is kept by the veterinarian of the Commission, who is made responsible for its accuracy	....	10	....	....	....	....	....	....
52. DATES OF TUBERCULIN TESTS.—Dates of the tuberculin tests are arranged by the medical milk commission, and the results are recorded by the veterinarian	....	5	....	....	....	....	....	....
53. Results of all tuberculin tests kept on file by the medical commission	....	5	....	....	....	....	....	....
54. The American Association of Medical Milk Commissions receives copies of all annual, semi-annual, and other official tuberculin tests made	....	5	....	....	....	....	....	....
55, 56. DISPOSITION OF COWS SICK WITH DISEASES OTHER THAN TUBERCULOSIS.—Cows having any disease which may be a menace to the herd are removed to a separate quarantine building. The milk from such cows is not used nor the cows restored until permission is given by the veterinary inspector	....	10	....	....	....	....	....	....
57. EMACIATED COWS.—Cows emaciated from any cause that may endanger the milk are removed from the herd	....	10	....	....	....	....	....	....
BACTERIOLOGICAL STANDARDS.								
58. BACTERIAL COUNTS.—The milk contains less than 10,000 bacteria per cubic centimeter when delivered	....	....	90	....	....	....	....	....
59. Bacterial counts are made at least once a week	....	....	10	....	....	....	....	....
60, 61. COLLECTION OF SAMPLES.—Samples to be examined are obtained from milk as offered for sale, and are taken by a representative of the milk commission	....	....	10	....	....	....	....	....
62-66. INTERVAL BETWEEN MILKING AND PLATING.—The intervals between milking and plating the samples are less than 40 hours	....	....	10	....	....	....	....	....
67, 68. DETERMINATION OF TASTE AND ODOR OF MILK.—Taste and odor of the milk is determined by bacteriologist	....	....	5	....	....	....	....	....
69. RECORDS OF BACTERIOLOGIC TESTS.—Bacterial tests kept on file by the secretary of Commission, copies made available for the American Association of Medical Milk Commissions	....	....	5	....	....	....	....	....
CHEMICAL STANDARDS AND METHODS.								
70, 71, 77-81. Quantitative chemical analyses of the milk are made by a competent chemist at least monthly	....	....	10	....	....	....	....	....
72-76. FAT STANDARDS.—Fat standard for the certified milk of 4 per cent is maintained within the permissible range of variation	....	....	20	....	....	....	....	....
82-86. COLORING MATTER AND PRESERVATIVES.—The milk is free from adulteration, coloring matter, and preservatives.	....	....	10	....	....	....	....	....
87, 88. SPECIFIC GRAVITY.—Specific gravity of the milk is between 1.029 to 1.034, and is determined at least monthly.	....	....	10	....	....	....	....	....
TOTAL	....	65	180	....	....	....	....	....

METHODS AND REGULATIONS FOR THE MEDICAL EXAMINATION OF EMPLOYEES, THEIR HEALTH AND PERSONAL HYGIENE.	MAXIMUM SCORE.				SCORE ONLY MAX. OR NEG.			
	1	2	3	4	1	2	3	4
	Dairy Hygiene	Veterinary Supervision	Chemical and Bact. Investig'n	Medical Exam. of Employees	Dairy Hygiene	Veterinary Supervision	Chemical and Bact. Investig'n	Medical Exam. of Employees
89. An attending dairy physician in good and legal standing resides near the dairy, is responsible to and directed by the commission	....	....	....	50	....	....	....	....
90. All employees before employment are subjected to a physical examination by the attending physician, and all prohibitive-requirements are enforced	....	....	....	50	....	....	....	....
91. All ordinary habits of personal cleanliness are enforced, and requirements of milkers as to hair, caps, and clean-shaven faces are carried out	....	....	....	20	....	....	....	....
92. The employees' dormitories are of approved construction. Separate beds are provided for each milker, and each is kept supplied with clean bedclothes. Bathing facilities are provided for all employees	....	....	....	30	....	....	....	....
93. A suitable building is provided for the isolation and quarantine of persons under suspicion of having a contagious disease	....	....	....	30	....	....	....	....
94, 95. When illness of a suspicious nature occurs, the attending physician immediately quarantines the suspect, notifies health authorities and the secretary of the Commission, and examines each member of the dairy force. In every inflammatory affection of the nose or throat, a culture is taken and examined by a competent bacteriologist. The secretary, on notice of contagious disease at the dairy, notifies the committee which assumes charge of the matter and acts for the Commission	....	....	....	30	....	....	....	....
96. When a case of contagious disease is found, such employee is quarantined, removed from the plant, and the premises fumigated	....	....	....	30	....	....	....	....
97. Following a weekly medical inspection of the employees, a monthly report is submitted to the secretary of the commission on the same recurring date by the examining physician	....	....	....	30	....	....	....	....
TOTAL	....	....	....	270	....	....	....	....

SUMMARY	MAXIMUM TOTAL.	ACTUAL SCORE.
Page 416	185	.....
" 417	150	.....
" 418	150	.....
" 419	245	.....
" 420	270	.....
TOTAL	1,000	.....

May I now be allowed to outline briefly the objects of this Association?

1. To maintain the integrity of the system for which this Association was brought into existence and around which plan the Association is organized.

2. To improve methods and standards with the purpose of securing their employment by every component Commission in the Association, together with efforts to secure legislation which will insure uniformity in Certified Milk in all places where it is produced.

3. To extend the work of the Medical Society Milk Commission by encouraging the appointment, in every county of every Commonwealth, of such a Medical Commission having the same objects and purposes, and, through the education of the profession and the public in the importance of pure milk, to advance the cause of the largest material factor in the conservation of child life.

The means by which these objects may be attained, as it seems to me, are:

First: By engaging the limited time at the disposal of the members of the component Commissions in the work of increasing the efficiency of their respective Commissions, thus increasing the quantity, quality, and the demand for this highest grade of milk.

Second: By collecting data from the experience of each Commission in the federation and using the information afforded by the work of their individual members and experts to summarize it for the use of the Association in improving its methods and standards.

Third: By arranging a carefully devised system of literature on clean and safe milk, its value, its need, and its use; by lectures to the profession and the public on established facts connected with the subject, and finally, by maintaining a traveling representative in the field who shall embody not only the disinterested motives of the medical philanthropist, but possess such high-grade qualities of heart, mind, and scientific attainment that every county society or academy of medicine before which he

might appear would retain him until an efficient Medical Milk Commission and Certified Milk were established facts in that community.

Nothing which has followed this, the initial pure milk crusade, started a quarter of a century ago, has, I venture to say, been so bold, so scientific, so altruistic, so comprehensive, so high in idealism, nor so wise.

With many Medical Milk Commissions depending upon this Association to uphold its code of methods and standards, to maintain the integrity of State laws framed and based thereon; with many representative medical societies looking to this Association to hold their Milk Commissions up to the standards of efficiency expressed in this code; with the entire medical profession depending upon this Association to give it the greatest desideratum in milk, no man or woman in the membership should fail to be impressed with their responsibility, nor fail to take the steps to attain the end in view.

Dr. Van Derslice: "The Chicago Medical Commission does not believe in a single standard. It does believe in the Association work of propaganda of clean milk. It does not believe that many of the cities of the South can make a 10,000 bacteria per c. c. milk. We do not believe that towns of 50,000 or less in the North can market a milk which is going to be made under rules made for the Chicago or Essex County Milk Commissions. Towns that are selling fifty quarts a day up cannot put a tax on the farmer which will allow of a medical inspection and a veterinary or sanitary inspection, and we must build our market from nothing. Take any town you are familiar with that has a Certified Milk Commission: did not the man from Pennsylvania say they sold as low as forty quarts a day? You cannot put a hospital on a farm and not bankrupt such a farm. The question is, What is the policy of the American Association of Medical Milk Commissions? Are we trying to standardize an article which we can never standardize because we will simply change the standard from day to day and from year to year? I believe

our work is getting a pure, clean milk, no matter what your maximum count is; but clean, fresh milk should be the cry of the Medical Milk Commission."

President: "This finishes the regular program of the day, but there is some unfinished business."

Dr. McCleave: "At this point I think it would be a courteous thing to send our greeting to the member who was so unfortunate as to have to be operated upon for appendicitis. We trust his recovery will be prompt, and if I were in his place it would be a grateful thing to receive a word of greeting and hope for recovery, and I would like to move that such a message be sent."

Motion seconded and carried.

President: "Regular business is now in order."

After an intermission of five minutes, the order of business was resumed, and the Convention proceeded to elect officers. This resulted as follows:

Dr. Otto P. Geier was elected Secretary.

Dr. William J. Graf, Assistant Secretary.

Dr. J. P. Sedgwick, Treasurer.

Dr. Walter S. Haines, Chicago, as member of the Council for five years, succeeding Dr. J. R. Williams, whose term had expired.

Dr. J. R. Williams, Rochester, New York, as member of the Council, to fill the unexpired term of Dr. T. C. McCleave.

Moved by Dr. Ager, and seconded by Dr. Coit, and further amended by Dr. Price, that the Council solicit funds from Milk Commissions and other sources to pay for the publication of the unpublished transactions of the Association. Carried.

A rising vote of thanks was tendered to the medical profession of Rochester for their kind hospitality and cordiality.

FOURTH SESSION.

Saturday Morning, June 20, 1914.

The session was called to order at 10:20 A. M., at the Hotel Seneca, by President Kerr.

President: "We are ready to take up the program, but before we take up the regular work I will ask Mr. Ernest Kelly to present some charts he has and give us a few minutes' talk."

Mr. Ernest Kelly, of the Bureau of Animal Industry of the Department of Agriculture, Washington, D. C., discussed the effect of clean milk on the public health, and illustrated his remarks, which were extemporaneous, by reference to a chart on which was plotted data concerning the occurrence of gastro-intestinal disorders at the United States Naval Academy, and which were attributed to dirty milk. As a result of this investigation a model dairy plant was constructed, in which there are approximately one hundred cows. Milk is being produced which meets the standards of Certified Milk. Since the installation of the model dairy there has been a noticeable freedom from gastro-intestinal disorders. This has been the only change in the régime at the academy, and since the students are under strict supervision, it is thought that the milk was the accountable factor in the causation of the gastro-intestinal disease. Mr. Kelly's presentation was both interesting and convincing. It is to be regretted that manuscript is not available for publication.

President: "We will now take up the regular program of the morning. It gives me pleasure to call on Dr. L. L. Van Slyke, of Geneva, New York, who will speak on "Some Chemical Relations of Milk."

Dr. L. L. Van Slyke: "It is the first time I have had the opportunity of meeting with your Association. It is not practical for me usually, but this year it came so near my home I was very glad to improve the occasion."

SOME CHEMICAL RELATIONS OF MILK.

L. L. Van Slyke, Ph.D., Chemist of the New York Agricultural Experiment Station, Geneva, New York.

It is now generally recognized that the value of milk as human food depends upon two classes of factors: (1) Chemical composition, under which we comprehend the thirty or forty chemical compounds normally contained in milk; and (2), freedom from everything that tends to affect injuriously the health of consumers, whether micro-organisms or toxins or preservatives. Up to about fifteen years ago the first set of factors served as the chief center of discussion; since then the emphasis has rapidly shifted to the second set of factors. Formerly pure milk meant simply normal or unadulterated milk; now it means rather milk that is biologically or biochemically clean.

In discussions relating to pure milk, we were formerly told that milk consists of water and solids, the latter being made up of fat, sugar, casein, albumin, salts, etc. The present-day discussions might easily lead an uninformed layman to believe that milk consists simply of water and solids, the chief solids being dirt, bacteria, and leucocytes, and that the chief object or ideal condition in producing milk is to keep solids out of the milk as much as possible—a condition which would logically lead to the ultimate conclusion that the healthiest milk is boiled water. So far as the water end is concerned, some dairymen appear to be in full sympathy with such a proposition regarding milk composition.

When requested to take part in this program, it first occurred to me desirable to discuss some of the later developments of milk chemistry, but further consideration made it seem more useful for this occasion to discuss briefly some phases of milk purity from the old-fashioned standpoint of normal chemical constituents.

Legal control of market milk is based on a so-called standard, which is simply a definition in terms of milk-fat and milk-solids in most cases. There is, and always has been, an imperfect understanding of what is meant by the expression, "milk stand-

ard," and it is a matter of surprise to know how general this misunderstanding has been. Milk which meets legal requirements in composition is commonly but erroneously spoken of as "standard" milk, in the sense that it is necessarily of excellent quality in respect to the amount of fat and solids present. Now, milk which comes just within the usual legal requirements is emphatically not excellent in quality, but is in reality poor and far below the average of normal milk in composition. While we commonly see in dairy literature such expressions as the "State milk standard," "standard for pure milk," "legal milk standard," "milk of the State standard of excellence," they are used, when properly used, not as implying excellence at all, but rather as expressing positive inferiority, or the lowest possible standard or limit that the law permits for pure or normal milk. The expression, "legal definition of milk," is preferable, because much less liable to mischievous interpretation than expressions in which "standard" is used in a way to permit the possible implication of excellence.

In legally defining the lowest limit in respect to composition of what shall be regarded as normal or pure milk, it has been customary to select two factors, milk-fat and milk-solids (or solids-not-fat), and to fix for each the lowest permissible limit. Two different factors have been selected, because more complete protection is obtained than if one alone were used, because the percentages of fat and of solids are somewhat independent and do not vary together uniformly. For example, taking a normal milk containing 5% of fat and 14.5% of solids; it would require the addition of 66 pounds of water to 100 pounds of normal milk before the percentage of fat is reduced to 3%, the lowest legal limit in many States; but the addition of only 21 pounds of water would reduce the solids below 12%, usually the permissible limit where the lowest limit of fat is 3%, and the diluted milk would still contain 4% of fat. Therefore, the basis of solids in addition to fat affords added protection against the practice of watering milk.

Now the chief purpose of a legal definition of what shall

be regarded as normal milk and what shall be taken as adulterated milk is to prevent, or rather to limit, the two most common forms of adulteration: (1) addition of water, and (2), reduction of fat percentage by removal of cream or by addition of skim milk. It is easily possible, however, to manipulate milk rich in fat, both by watering and by skimming (or addition of skim milk), so that it is difficult and often impossible to prove the fact of such manipulation by examination of the milk.

In attempting to fix a line of division between milks that shall be regarded as pure and those that shall be considered as adulterated, it is obvious that two general difficulties must be faced, because normal milk varies so widely in composition and the relation of milk-fat to solids also varies widely. On the one hand, the lowest limits for legal milk must be placed high enough to prevent too great opportunity for manipulating by watering or skimming milks that are above average richness. On the other hand, the minimum limit must not be placed so high as to put in the class of adulterated milk the normal product of too many herds of cows. In framing a practical legal definition for pure milk, these two difficulties cannot be overcome completely, and, therefore, an arbitrary line of division must be drawn. On this account we have in different States and cities marked variation in the legal limits regulating the sale of milk. The milk-fat lowest limit varies all the way from 2.5% to 3.7%; the milk-solids, from 11 to 13%, and the solids-not-fat, from 8 to 9.3%. The definition of minimum requirement that has been most common is the one prescribing 3% of fat and 12% of solids, and this has been shown by long experience to be practicable and useful and reasonably efficient.

A curious objection has been made against these particular figures on the ground that in normal milk these relative proportions rarely exist; that is, that normal milk containing 3% of fat rarely contains as much as 12% of solids; or, stated in another way, that normal milk containing 12% of solids generally contains more than 3% of fat. These figures were selected not because they were supposed to represent the exact relations

of fat and solids in normal milk, but because they afforded greater protection to the consumer, especially against watering, than would the figures more closely representing the average found in normal milk. This fallacious argument was used effectively a few years ago in persuading the Legislature of New York State to change our minimum limit of 12% to 11.50%—a reduction which has the practical effect, in case of milks above average composition, of permitting the addition of about five pounds more of water per one hundred pounds of milk. In this connection your attention is called in passing to the fact that there are two methods of watering milk, one illegal and the other legal. It is illegal, for example, to add water to milk by hand with a dipper after the milk leaves the cow; it is entirely legal to reach the same result by making the cow herself the instrument of the unholy practice of watering milk, which is realized among milk producers by the use of cows bred and brought up to put large amounts of water into their own milk. The lowering of a limit of composition encourages both methods of watering, but especially the safer one. I suppose it may be regarded as a special application of the general law that water seeks its own level.

Among the many legal definitions of composition of normal milk, the one which may be regarded as furnishing in all respects the fairest results to both producers and consumers makes use of the two factors, fat and solids-not-fat, prescribing the minimum limits of 3.25% of fat and 8.50% of solids-not-fat. Time does not permit on this occasion a sufficient statement of details to make this statement clear, but a brief illustration will show how such a definition limits tampering with milk, especially by watering, within a much narrower compass than does, for example, the definition of 3% of fat and 12% of solids. Thus, taking what may be regarded as average milk, containing 4% of fat and 13% of total solids, it contains 9% of solids-not-fat. If to 100 pounds of such milk we add 8⅓ pounds of water, the resulting mixture contains 12% of total solids and 3.7% of fat, but only 8.3% of solids-not-fat. Under most legal definitions, this watered milk would pass for normal milk; but under

a definition placing 8.50% as the minimum limit for solids-not-fat, the milk would be regarded as watered.

This brief discussion enables us to appreciate clearly that no definition or minimum standard of an article so variable in normal composition as cow's milk can by any possibility of human ingenuity be so devised as to give complete satisfaction to consumers and producers.

In view of this condition, the time is fast approaching, if it has not already come, when our long-used and long-misused method of regulating the composition of market milk can be advantageously supplemented, and perhaps finally superseded, by introducing a method which permits the sale of milk under a minimum guaranteed percentage of fat or of both fat and solids.

Time permits nothing more than a brief, imperfect statement regarding the fundamental basis of such a system and some of its more obvious advantages. Under such a system any normal milk could be sold if the per cent of fat is stated; though, as further protection to consumers, it would be desirable that there be also a minimum guaranty of milk solids-not-fat of not less than 8.5%. In case no guaranty is stated, the sale would be regarded as a violation unless the milk contained at least 3.25% of fat and 8.50% of solids-not-fat. Dealers electing to sell milk under the guaranty system should be required to state conspicuously the guaranty on all containers in which such milk is handled by the dealer or delivered to the consumer. The sale of milk on a guaranty system should be by special permission obtained from some proper local authority.

Among the more obvious advantages of such a guaranty method of selling milk are the following:

(1) It would encourage the sale of milk on the fundamental basis of its food value. Intelligent consumers would come to appreciate the difference between poor and rich milk in a way they do not at present.

(2) It would encourage the production of a larger amount of richer milk when producers can sell milk on the basis of its nutritive value.

(3) It would readily find an application in the case of producers whose herds produce milk below the limit of legal requirements. By guaranteeing its composition, the producer could dispose of it without reference to the usual limits of purity prescribed by a so-called standard.

(4) A guaranty system inevitably tends to promote greater intelligence regarding the composition and value of milk on the part of both producers and consumers. Objection may be raised that the process of educating customers about the composition and commercial value of milk must be so slow as to be practically hopeless, especially among the masses in large cities. The same objection would apply with even greater force to the education of consumers in regard to the value of sanitary milk and the necessity of its proper care in the home. The delivery of clean milk in a city home is only one end of the problem; its care after that is quite as important, and is a matter of education. Because it is a slow and difficult process to teach consumers to care for milk in the home, it is not a valid reason why the problem of supplying clean milk should be abandoned. Similarly, the introduction of a system of selling milk on the basis of guaranteed composition should not be indefinitely delayed merely because its fullest usefulness requires that milk consumers should know something of the relation of composition to commercial value. Those who have watched carefully the effect of the enforcement of the United States pure food and drug law upon consumers have been agreeably surprised to observe how readily the average consumer has become interested in the question of pure food products.

(5) A guaranty system of selling milk can easily be made to permit the practice of adjusting the ratio of fat and solids-not-fat to meet special trade conditions. In some States such adjustment is permited within certain limits.

Dr. Van Slyke also said: "I have gone over these general questions in this superficial manner rather to prepare the way for a discussion than to present the question extensively."

President: "The papers are all of a high order and so diversified in character, I think it would be well to invite discussion after each one. The paper of Doctor Van Slyke is therefore open for discussion. This is an important subject from the standpoints of both the consumer and producer, and from the standpoint of the officials enforcing the laws on pure food and pure milk. I would like to hear as full a discussion as possible."

Dr. Ludlum: "This brings up the subject that has not been raised in several years, I think, and that is the maximum as well as the minimum standard of richness of Certified Milk. The question is raised from time to time, but no action has ever been taken about it, and I do not know whether it has in other Commissions or not. The only feasible way to accomplish an equalization of strength would be by close chemical work at the farm, and balancing the high and low fat against one another. How much that is done in other Commissions I do not know, but that question may be worth while to think of in the future."

Prof. F. W. Howe, Framingham, Massachusetts: "I am a guest of the Association, but I would like to say just a word. I think the paper is very timely, because the system is in accordance with the pure food and drug laws at the present time. I would like to suggest another instance in Concord, just outside of Boston. It has been waging a fight with the Legislature for several years. They call it the second Concord fight. The most of them have Holstein cows, and many are shut out of the market because they do not meet the legal standards of the State of Massachusetts. They want to get a law to simply state on the package what the composition of the milk is, and if they can do that their milk could go into the city markets. That is true of a great many herds to-day. There are others shut out of the Boston market. If there were a law enabling them to guarantee on the original package what the contents were, it would be very much to

the advantage of the consumer, as well as to that of the producer."

President: "We are fortunate in having with us Professor Stocking, of Cornell Agricultural College, who has attended previous meetings and who has been identified with the work of the Association."

Professor Stocking: "Dr. Van Slyke's subject is one of importance, both from the standpoint of the consumer and producer of milk the country over, and I agree with him that it does not make very much difference whether the cow puts the water in or whether it is put in after it has left the cow, so far as the effect upon the consumer is concerned. I believe the time is coming when milk will be sold on the basis of its food value, combined, of course, with its sanitary qualities. I have felt for a good while that our standards of certain per cents of fats and solids were unsatisfactory and caused hardship to both producers and consumers, because the present system prevents perfectly wholesome milk from coming into the market and being sold for what it is worth. I hope the time is coming when milk will be sold on the basis of its real food value instead of a fixed standard, as we have it at the present time. This will make it possible for the consumer to buy wholesome skim milk at just prices, and obtain a valuable food product."

Dr. Coit: "I am much interested in this phase of the milk question, but, coming in late, I do not know what part of the subject Dr. Van Slyke's paper covered. I believe a great deal of harm is done by the idea that milk must be better because it is rich, and that it must have so much cream in the bottle. There is no clinical phase of this question which is so misunderstood as that of fat in the milk. There was a school of teaching which made it necessary to feed one baby the top from four quarts of milk of a high degree of richness. Objections were raised, among them that it was a financial

burden upon the father and a digestive burden upon the baby. Now the leaders in infant dietetics have drifted to the other extreme and are feeding babies on whole milk. A concensus of opinion now makes fat the greatest among the difficulties in using the milk of a lower species for feeding the baby.

"Fat and its relation to the digestive capabilities of the baby will, I think, reveal a great many facts which we now have no knowledge of. We shall discover some day that there is a difference in the character of the fat from the different species of cow. Some of us think that the milk from the Holstein cow gives better results than from Jerseys."

Dr. Van Slyke: "It is generally known that fats are difficult to digest in the stomach—perhaps the fat of milk least of all fats, but that it is difficult in most cases. If it can be gotten beyond the stomach, it is the best thing any one can take.

"In reference to super-fat milk, I think perhaps there is a misunderstanding. I take it that what Dr. Coit means by super-fat milk is a milk containing five per cent or more of fat. Speaking broadly, there is practically no difference in the relative amounts of the fat nutriment as between the fats and the proteids. In other words, take Jersey milk containing five per cent of fat and reduce it by the addition of clean water to the percentage of fat contained in Holstein milk (either three and a half or three and a quarter), and you have practically the same milk. Of course, in the Holstein milk you will have a little more protein, but I do not think that the difference in the ratio is sufficient to make any trouble whatever.

"Speaking of rich milks as compared with poor, I think this is mostly a difference in the amount of water. Doctor Coit made a suggestion that the difference between Holstein and Jersey milk is owing to the difference in the composition of fats. A great deal of work has been done along this line and in different periods of lactation, and while there are dif-

ferences in the composition of the milk, there are no general conclusions that can be drawn which would justify Doctor Coit's hypothesis. The composition of the milk fat differs just as much in the case of one cow under different systems of feeding or lactation as in different breeds.

"What we do not know about milk, and especially in relation to infant feeding, would fill a great many more volumes than what we do know. In talking with specialists, I am impressed with the fact that they are governed a good deal by hypothesis, which to a very large proportion is empirical—a method of cutting and drying—because we do not know all about the composition of milk yet: lots of little things remain to be found out. There are undoubtedly constituents in the milk which exercise a great influence upon the body and which are present in such a small proportion that no one has yet discovered anything about them.

"About Jersey and Holstein milk; if it is clean and we give it such dilution as it needs, I think you will find it meeting with the child's requirements. We have a herd of goats and have found many instances of babies, who met with difficulty in the digestion of cows' milk, where goats' milk was found to give most remarkable results. Why? I do not know; that is a fact. As I said before, there are lots of things we do not know about the composition of milk."

President: "In the English-speaking conference last year in London, while reviewing in brief manner the legal steps taken for the control of milk supplies, I cited some examples to show the present status of our efforts in the United States and the improvement in our milk supplies. Among the one or two cities mentioned, I selected Richmond, Virginia. That city is located in a part of the country where there are long summers and where the weather conditions, we think, are conducive to much difficulty in producing clean and wholesome milk. The work for the improvement of health conditions and the milk supply has been going on there for a

number of years. At the meeting of this Association in Philadelphia three or four years ago, Doctor Levy, the health commissioner of Richmond, gave the results of his campaign for clean milk. On that account, and on account of the remarkable success he has had, I insisted that he should tell us something of his later work. I took pleasure in asking Doctor Levy to attend our meeting and take part on the program. He is now prepared to give us a paper on the results of his dairy inspection."

SOME RESULTS OF SEVEN YEARS OF DAIRY INSPECTION IN RICHMOND, VIRGINIA.

By E. C. Levy, M.D., Chief Health Officer.

When I was invited, a few months ago, by the President of the American Association of Medical Milk Commissions to tell what has been accomplished in connection with improvement of the milk supply of Richmond, I greatly appreciated the honor, but at the same time felt that it was a little peculiar to discuss this subject before this special Association. There has never been a drop of Certified Milk produced for the Richmond market, and, in my opinion, there never will be. Our entire milk supply has been brought to a point where it is safe for infant feeding, and hence there is not any need for Certified Milk.

Our work of dairy inspection started on May 1, 1907. At that time the average score of all dairy farms producing milk for the Richmond market was less than 40 on the Government score card, and over fifty per cent of all our dairy farms scored under forty. Very few of them indeed scored above 60, and not one of them scored above 80. At the present time our average score is 83.2, no scores under 70, and only ten per cent of our places score under 80.

The following diagram exhibits better than any description or any table of figures can possibly do the advance that has been made in the control of the milk supply of Richmond.

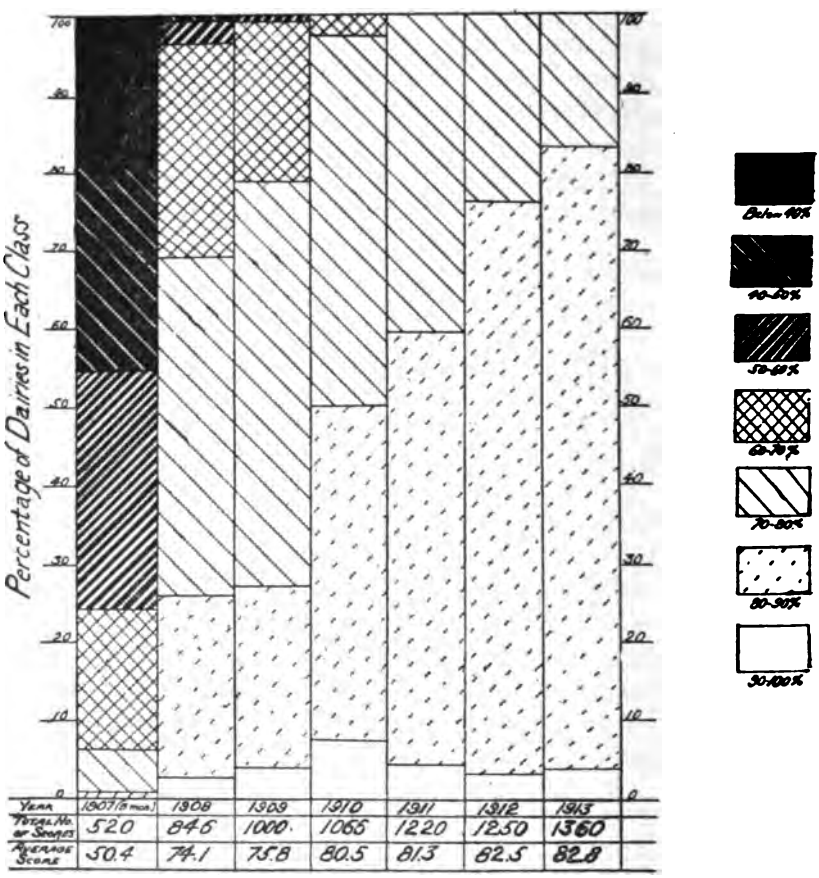
DIAGRAM SHOWING IMPROVEMENT IN

DAIRY SCORES

DURING SEVEN YEARS OF DAIRY INSPECTION

1907-1913

HEALTH DEPARTMENT RICHMOND, VA.



Needless to say, the above results have been obtained by persistent work and in the face of such opposition as is inevitable in such matters. I believe that in no single way can I so well show the kind of milk that Richmond is getting as by the follow-

ing table, which gives the results of the bacterial examination of our milk supply for the past four calendar years:

Bacteria per Cubic Centimeter.	Per Cent of All Samples Examined.			
	1910.	1911.	1912.	1913.
Less than 10,000	14.1	31.0	42.0	37.2
Between 10,000 and 50,000	56.5	46.0	35.3	38.0
Between 50,000 and 100,000	15.3	11.7	9.2	12.4
Between 100,000 and 250,000	11.9	6.9	7.1	7.6
Between 250,000 and 500,000	2.2	2.0	3.4	3.1
Between 500,000 and 1,000,000	.....	.8	1.5	1.0
Between 1,000,000 and 5,000,000	.....	1.4	1.3	.7
Over 5,000,000	.....	.2	.2	0.0

The above table shows that for the past two years about forty per cent of our entire milk supply contains less than 10,000 bacteria per cubic centimeter, and is in this respect up to the generally accepted standard for Certified Milk. At least seventy-five per cent of all samples of milk examined during the past three years have given a bacteria count under 50,000.

In considering the question of bacteria it must be remembered that our farmers are very seldom able to produce their own ice, and, since the temperature of our well and spring water is about 58°, milk cannot be cooled to less than about 62° to 65°. We require immediate cooling of the milk from each cow by the use of an approved cooler.

As an offset against the above, most of our milk supply comes from within a radius of eleven miles of the city. We must, therefore, rely upon cleanliness and quick transportation, rather than upon cooling, for getting to our consumers milk with a low bacteria count.

While use of the narrow-top milk pail and special attention to cleanliness of the cow, the milker, and the utensils have been shown to make possible the production of clean milk in a dirty environment, I have always felt that this method was too hazardous, and that we should have properly constructed barns and cleanliness all along the line.

Over seventy-five per cent of our cow-barns have concrete floors from sidewall to sidewall, with properly constructed drops and mangers. At least eighty-five per cent of our barns have pipe stalls and stanchions.

In my opinion, the special thing that has marked our work has been its constructive character. Too many dairy inspectors think that their main function is to find fault—to tell the dairymen that their places and methods are bad, and that unless they do better their permit for the sale of milk will be revoked. Of course this is a necessary thing to do, but it is equally necessary to have inspectors who will tell the dairymen just what they must do and who will assist them in doing it.

Every person who wishes to produce milk for the Richmond market is furnished with a full set of working blueprints. We have several types of barns, and furnish each man with plans of the best type adapted to his needs. While it is possible to spend a great deal on a cow-barn, it is not necessary to do so. We have perfectly sanitary barns constructed according to our plans, with concrete floors, pipe stalls, smooth ceiling and sidewall, and abundant light and ventilation, which have been constructed at a cost of not over thirty dollars per stall.

We have not as yet enforced compulsory tuberculin testing. A rule adopted on March 30, 1914, provides for this to go into effect on September 1, 1915. For over a year we have had in operation a rule requiring tuberculin testing of all new herds and of all new cows added to old herds.

During the seven years of dairy inspection the only contagious disease of any kind due to our milk supply was one small outbreak (seven cases) of diphtheria. This was in August, 1908. We have had no outbreak of typhoid fever, scarlet fever, or septic sore throat.

It is impossible to tell, within the limits of an ordinary paper, everything that has been done to bring about the present excellency of our milk supply in Richmond. This has been the result of seven years of hard work, and cannot be told in a few minutes. For this reason I think it best not to prolong this paper, but rather to reply to any special question that any of you may wish to ask.

President: "I will ask Mr. Kelly to open the discussion, because we are all familiar with him, and he has been all over the country and is somewhat acquainted with the Richmond situation."

Mr. Kelly: "It was my privilege about two years ago to visit Richmond and see something of the dairies around there. To be perfectly frank, I had been a little bit skeptical about the wonderful results obtained, because I had seen such claims many times before and had been disappointed. I must say, however, that after visiting the ones we saw I was remarkably surprised at what had been accomplished, and the results were certainly a credit to the city of Richmond and to Doctor Levy.

"I think one of the most impressive things about Doctor Levys' talk is his description of the qualifications of the dairy inspector. To my mind, one of the greatest drawbacks has been along this line. The political situation of affairs, the employment of old saloonkeepers and men without any training at all, has been a great hindrance. How can you have good work by such men as that? We must have men who are absolutely trained, both in sanitation and in the ethics of the subject. I have seen so much misuse of the office, and I feel that you members of the Medical Milk Commissions can do the greatest amount of good in your community if you will see that your inspectors are men who can go out and meet the farmer on something like an equal footing, and in that way you can secure the best results."

President: "At the proper time I would like to have Doctor Levy say whether the milk supply has had any influence on typhoid fever."

Dr. Moak: "I wish that every member might be skeptical enough to carry their skepticism to a point where they would go to Richmond and view the situation for themselves. I went to Richmond last year. Doctor Levy put his most excellent inspector at my disposal, and took me around to a good many of the farms to see the actual condition. We

came back and I thanked the man very kindly, and my skepticism was such that I afterwards went out and visited nearly all the dairies I had not seen with the inspector. You would appreciate the fact that Doctor Levy has been exceedingly modest in all that he has said if you were to go to Richmond and view the conditions in that city. As he says, they have not a quart of Certified Milk in the whole city, but they have lots and lots of milk equal to Certified Milk, and milk barns and equipment as good as many I have seen in this country where they have Certified Milk. They have a number of barns and equipments that are a great deal better than those I have seen where they are making Certified Milk. It looks to me as though Richmond had gone about the proposition in a very interesting and proper way, in that they have cleaned up their dairy farms and had new buildings put up of such a type that when they have to duplicate them they will be able to get right at it. Take the average farm, and then go to Richmond, where they have secured their good equipment and where they can go to work with some assurance that the good results secured can be maintained. I would like some of the recent data on the subject. They will probably soon have tubercular-tested milk in that city."

Dr. Coit: "I have discovered that Doctor Levy, while he has employed the fundamental principle for obtaining Certified Milk in his inimitable work in Richmond, is not guilty of any misdemeanor. He uses the principles of encouragement and endorsement which are used by us. I think that health departments and Milk Commissions should be in sympathy in relation to pushing this whole matter forward, and I am glad that these are his principles of work."

Dr. Wherry: "I wonder whether Doctor Levy has worked out the relative cost of production of the different classes of milk; that is, does it cost a great deal more to produce the milk under 10,000 than that between 10,000 and upwards, etc.; also about what this milk is sold for, and whether it costs the farmer who produces the cleanest milk much more

to produce it than it does to produce the milk at the lower end of this column" (referring to chart).

Secretary: "Whenever I hear Doctor Levy discuss the Richmond situation I am always deeply impressed with his modesty. It seems to me it is misleading. He gives us the impression that it is an easy thing to do. That is modesty, but sometimes it is not as helpful as if we admit how difficult a thing it has been to arrive from nothing to somewhere. I think we need the personal equation of the men in the field who are educated, instead of political men and men of no depth who are "long on the green" and not deep in intellect or in knowledge or sympathy with the dairymen. After all, Doctor Levy's results have been obtained because he has emphasized the educational work in his crusade.

"One question, I have: Is Doctor Levy not violating a business principle when he allows all his milk dealers to come into the market on an even basis, when his figures show a greater excellence on the part of thirty-seven per cent; is it not fair that the dairyman wants to be rewarded in the direct ratio of the excellence of his product?

"He says that he does not need the Milk Commission. The Milk Commission should fulfill its part in finally securing the men of Doctor Levy's type to carry on the work of milk production and to secure a Milk Commission which, with the help of the health department, would secure better milk and be recognized in the community."

Dr. Bleyer: "In Saint Louis some of the producers seem to feel that they are not making very much money. The first producer of Certified Milk with us stopped producing it because he was losing money; after working hard for three or four years, he gave it up; the trouble was in the high cost of distribution, which he unfortunately attempted to handle himself.

"We are told that in Richmond, in 1912, forty-two per cent of the milk ran below 10,000 bacteria and was not certified; I had the impression that this was from dairies not very

expensively put up. I think it would be very helpful to find out whether a great many dairies producing Certified Milk are doing so at a needless expense to themselves. Some years ago a special committee was appointed in New York to find out whether Certified Milk could be produced more cheaply than under the regulations of the Milk Commission, and reported that this was quite possible."

Dr. Mercer: "I find that Geneva has already made some experiments in the production of Certified Milk, and a possible reduction in cost."

Dr. Van Slyke: "I would say that this work was carried on by another member of our official staff. All the facts are set forth in a bulletin published by the station, which can be obtained by application."

Dr. Wilson: "One point ought to be brought out with a little more emphasis. Any one who thinks Doctor Levy had an easy time ought to try it. On the other hand, what every man in this audience ought to take home with him is the fact that there is not a city, town, or hamlet in this country which, if they begin with the same good sense and good management that Doctor Levy used in Richmond, cannot duplicate the work in less time than it took him, because they have his example to guide them. I know it could be done in Wheeling, and I think that if any one in this audience will take home with him the points that Doctor Levy has given us, they can duplicate this work in their own town if they use the same sound judgment that he did."

Dr. Levy: "Replying to the point brought up by Mr. Kelly as to the embarrassment caused by politics, I am sure that our work in Richmond has never suffered from this cause. If I am ever placed in a position where it seems necessary to do anything on account of political pressure, I can only say that rather than do this I would certainly resign.

"Regarding Dr. Kerr's question about typhoid fever, our death rate from this disease has declined marvelously, but

not, so far as I can see, on account of any improvement in our milk supply. Our average annual death rate from typhoid fever for the twenty-six years prior to my going into office was 77.8 per 100,000 inhabitants. Careful study of all cases during the first year and a half convinced me that neither our water nor our milk supply was responsible for this high rate. Late in 1907 I reached the conclusion that the chief cause of typhoid fever in Richmond was the large number of badly constructed and badly maintained dry closets. We had at that time about 3,500 of these in the city, and practically all of them were in a very dilapidated condition. It was not until the spring of 1909 that I was able to get to work on these. All were then put in good shape, and the very first year (1909) our death rate from typhoid fever fell to 24.1 per 100,000. In 1910 the rate was 21.9; in 1911 it was 17.7; in 1912 it was 16.7, and in 1913 it was 20.3. These rates include a number of deaths of persons who neither lived in Richmond nor contracted the disease in Richmond.

"In closing this discussion, I wish to invite this Association to meet in Richmond, so that all its members may be able to see for themselves what we have accomplished with our milk supply. Dr. Moak has told you what he saw on his visit, and has further told you that only by seeing for yourself can you understand how much has been done. I had hoped to have you meet in Richmond in 1915, but I understand that you will go to California next year. I therefore invite you very cordially to hold your 1916 meeting in Richmond.

"Enough of you have attended meetings in our city to know that you will be well looked out for. I may add that unless you believe our excellent milk will satisfy all of you, it would be well for you to hold your next meeting in Richmond in the spring rather than in the fall of 1916, as a certain law goes into effect in November, 1916, which will limit you to either milk or water after that date."

President: "The members of the Council will hold a meeting at the lunch hour. I now take pleasure in calling on

Hon. S. A. Carlson, mayor of Jamestown, New York, who will speak to us on the subject of 'Municipal Supply and Distribution of Milk.' He approaches this subject from a little different standpoint from that of the health officer:"

MUNICIPAL SUPPLY AND DISTRIBUTION OF MILK.

Hon. Samuel A. Carlson, Mayor, Jamestown, New York.

Most of our communities are beginning to wake up to the fact that there is a vital need of greater precaution and more effective measures in the control of milk production and distribution.

The inspection of meats and of drugs is important, but of how little significance is it, measured by the criteria of our morbidity and mortality rates, when compared with an effort to insure a pure milk supply! During the summer of 1910 bad milk was responsible for the death of 54,266 babies under two years from diarrheal diseases in the United States, 9,740 of which were New York State babies.

It is a matter of record that one third of all cattle in the State of New York are tuberculosis infected, and our foremost medical authorities are now agreed that "bovine tuberculosis is transmissible to man.

Dirty and germ-laden milk, therefore, means sick babies and crape on your door. Clean, safe, and fresh milk means healthy babies and a low infantile death rate.

There is no article of food that affects the people from a health and economic standpoint as much as the milk supply. In fact, the milk problem touches the very foundation of human life. Sanitary science has shown that there are two principle sources to which epidemics are traceable, namely, milk and water. The danger from water contamination has been eliminated by centralizing the supply of water to one single source, but the danger from the milk supply is still imminent in consequence of the present unsanitary handling of milk and disorganized system for its distribution.

Public welfare, public safety, and public health demanded the municipalization of the school system, the sewer system, the fire department, the water supply; and the time has now come when public health demands the municipalization of the milk supply. And in this connection I want to say that a proposition is now under consideration in the city of Jamestown which contemplates the establishment of a municipal milk supply and sanitary distribution system. Under the plan proposed, all milk will be purchased by the city and brought to a central station and then subjected to a scientific test, each can of milk separately, as to percentage of bacteria, butter fat, etc. All milk not taken from tuberculin-tested cows will be pasteurized, after which it will be sold and delivered to consumers by the municipality in a sanitary and systematic manner. This plan has the endorsement of the Jamestown health authorities, and now awaits the sanction of the taxpayers.

Competition in the milk business may have its proper field in the production of milk, but in the field of distribution milk competition is useless, costly, and dangerous. Under conditions prevailing in most communities, citizens are unable to know what they are buying and dairymen are unable to know what they are selling.

There is no way by which the purity and quality of milk can be determined except by means of a laboratory examination at a central municipal plant, at which place each can of milk can be tested in a scientific manner, resulting in a benefit to the producer, in that he would be paid a price on the basis of its low percentage of bacteria upon one hand and high percentage of butter fat upon the other hand, and the consumer would be benefited in consequence of the assurance of pure milk. If every purchaser of milk would realize the truth of this fact, and the tremendous importance of it; if the mothers of each household could fully realize the futility, even with the best inspection, of being protected under the present competitive system; if they could see the impurities that can be removed by a clarifying machine, which in some cases has extracted as much as a half wine-glass of impurities and diseased matter from only one gallon

of milk of the quality usually offered for sale—when they realize all these things and its effect upon health, the demand will be so great for the municipalization of the milk supply that no private influence will be able to resist such an undertaking by the municipality.

Knowledge of milk would be the starting of the work, and there never would be any end to it; one improvement would follow another, and with wide-open publicity and with no motive to deceive, the method of improvement and the willingness to pay for it would go hand in hand and the milk problem would be solved.

As a rule, under existing conditions two elements enter into most enterprises: service and exploitation, and the consumer is ordinarily able to pass judgment upon articles supplied by competitive methods; but in the matter of milk he is absolutely helpless, because he does not know what he is buying; therefore, exploitation must be eliminated in the milk supply and delivery, and the supply must be a matter of public service, precisely as putting out fires, educating children, maintaining public streets, furnishing water, etc., is now a matter of public service. Moreover, the element of health enters into this milk handling more than any other thing, for the reason that milk attracts all disease germs to which it is exposed, and in turn the same is transmitted to the human body, and that this is a great source of most sickness is conceded by the foremost authorities in the field of science and sanitation.

Looking at this proposition from a purely economic standpoint, there is much greater force in support of the argument for the public delivery of milk than there is in support of public delivery of our mail through a central system and by an organized method of delivery.

But it takes time to educate the public; people, as a rule, prefer the old way of doing things and are slow to adopt innovations. This is true of all communities. Reforms along sanitary lines have always been objected to when first proposed. When a municipal water supply, a school system, a sewer system, and other public service institutions and systems were first agi-

tated, there was the same opposition that is now manifest with reference to municipal distribution of milk.

The recent investigations regarding the milk supplies of our cities have led medical authorities and sanitary experts to declare strongly for public control and ownership of milk supplies as the only real and effective solution of this important problem and its bearing upon the public health.

Investigations made in Rochester, New York, some time ago, demonstrated the fact that in one section of that city 66 milkmen supplied 786 homes, traveling 57½ miles to do what one man could do in 5⅗ miles. In another section it was shown that 34 milkmen supplied 216 homes, traveling 38 miles to do what one man could do in a travel of 2½miles. And still in another section it was shown that 40 milkmen supplied 340 homes, traveling 30 miles to do what one man could do in a travel of 3 miles.

We have the same situation in all other communities, and this enormous element of waste is paid for by all the people. Under a municipal system this unnecessary burden of expense could be eliminated, besides affording a supply free from dangers which are now imminent as a result of the present unsanitary handling of milk. The saving in a systematized system would pay the cost of a plant and all other expenditures incidental to a central municipal supply, and at the same time enable the city to supply safe milk, under ideal conditions, without increased cost.

Furthermore, under a municipal system there would always be ample opportunity for the production of by-products, such as buttermilk, cream, butter, and cheese, of a superior quality and at a profit to the city.

The estimated cost of a pasteurization plant for a third-class city would not exceed $50,000. The annual maintenance and distribution system, not including cost of milk, would be $75,000, payable not by tax, but by revenue.

In attempting the solution of the milk problem, municipalities and public health workers have very generally regarded it as purely a sanitary problem, and from that standpoint alone it has been attacked. Vital as is this basis, it is quite conceivable that there may be other salient factors which are largely overlooked.

For example, if it were assumed that to comply with stringent health ordinances relating to the production and distribution of milk would mean financial disaster to those engaged in the work, the problem would then have an economic basis which, to the dealer and producer at least, would transcend in importance the sanitary phase of the question. For, obviously, men will not make and sell pure milk if it cannot be done profitably. And if the imposition of the law and ordinance tending to safeguard public milk supplies operate to lessen or destroy the financial reward of those engaged in the industry, it is inevitable that either the business must fail or the law be evaded. It should be remembered that the milk industry, in spite of the public character given to it by city and State supervision, is amenable to the same laws of business as is any industry which deals in commodities. It is quite probable, therefore, that the problem has an economic basis of much greater significance than is generally believed. The great majority of citizens pay out more for milk each year than they pay in taxes for all city purposes. The total milk bill runs into millions of dollars annually.

The waste of time, energy, and equipment under the old method is very much greater than is generaly known. At the present time half of what the consumers pay for milk is required to maintain this wasteful system of distribution. The farmer receives per quart for his milk no more for owning and operating a dairy farm, preparing the milk for market, and transporting it many miles into the city, than does the distributor, who merely receives it at the railroad, bottles it, and delivers it to the consumer. This is obviously a very unfair divison of revenue.

The objection raised against the municipalization of the milk supply on the ground that it carries paternalism too far is answered by the fact that in all matters in which the public health is involved the agency of government must assume full and complete charge. Public control of milk is absolutely essential as a means of safeguarding human life and conserving the public health.

Dr. Williams: "This is a subject quite dear to my heart. I believe we have spent too much time talking about milk

and too little time talking about the milk peddler and his environments. Some one has said there is nothing beautiful which is wasteful, and I think that might be modified to a certain extent to apply to the milk problem. Nothing will ever come out of our efforts to control the milk problem which overlooks the economic phase of the question.

"I have studied the milk situation in something like fifty cities, and the same waste found in Rochester is to be discovered in practically every city in this country. They used to say it was not the case in New York or Philadelphia, but I am convinced that it is. I was told in New York a short time ago that some of the big dairy companies there are gradually absorbing the smaller ones, but that instead of putting more milk wagons on the street, they are taking them off. The more business they acquire, the less wagons they require for distribution."

Dr. Thomas: "Our health commissioner has precisely this idea in mind as an ideal for distribution of milk. In fact, he read a paper a year ago in Washington, before one of the public health associations, which embodied these same principles. He is very firmly convinced that this is the solution. We have the best Market Milk supply in Cleveland of any city in the country. We have three-cent street-car fare, and are starting in with three-cent electric light and three-cent almost everything, even a three-cent sandwich. Our present mayor started a campaign on the three-cent line—a municipal light plant. The old company charged, by the way, from six to twelve cents per unit, so we may be able to force our great big company which produces and distributes Certified Milk to terms."

Mayor Carlson: "It is much easier for the smaller communities to control the milk supply than for the larger ones, because of the element of waste not being so great and the smaller community deals more directly with the producer than the larger community.

"In Jamestown there are some two hundred and seventy-

five dairymen who supply the city for a radius of ten or fifteen miles, and we have about ninety milk peddlers in the city. It is an impossibility for a city to have an inspector go into all these places every day and see that the milk produced is up to standard. Under a municipal central station the milk would all be brought to this one place and the laboratory equipment provided, and every can would be tested separately and every inducement made to the farmer to produce good milk, because he would be paid on basis of quality. And the consumer would be benefited by the assurance that the milk was pure and safe.

"In Jamestown we are paying something like $500,000 a year for milk. We propose to save $150,000 for the community by economy in municipal distribution. We will have a central station and we will divide the community into districts and give each distributor a district, just as the United States postoffice does. The people of the city would not have to pay as much as they now do, nor any additional taxes. As a matter of fact, milk rates are taxes. We do not regard these private charges as taxes when we pay our money to a private institution, but if we pay the city treasurer we seem to feel a direct burden. If the city handles this proposition, the people, instead of paying the money to a multiplicity of milk dealers, each doing a business in competition with the other, simply pay it to themselves—to the city—to the community through city authorities, and in return get pure milk at less cost. That is the proposition we are considering in Jamestown."

Adjournment for lunch.

The final session of the Convention was held Saturday afternoon, June 20, at Elm Place Farm, Avon, New York, Dr. Kerr presiding. At this meeting the milk producers of Western New York were invited, and a large number were in attendance.

The first paper on the program was by Dr. H. C. Campbell, of the Bureau of Animal Industry:

PRACTICAL METHODS OF MILK EXAMINATION.

Dr. H. C. Campbell, Bureau of Animal Industry.

There are many different and complicated tests applied to the examination of milk, some of which are of little value in determining its quality. Some years ago the main tests applied to milk examinations were of a chemical nature, and gave little or no information regarding the hygienic conditions under which it was produced. These tests laid particular stress upon the per cent of fat, nitrogen, sugar, albumen, etc. After the discovery of bacteria, some attention was given to the number of bacteria in connection with the chemical tests, but no importance to the kind.

Only within recent years (in cities where a thorough milk inspection is applied) has there been any study given to the kind of bacteria along with field work.

A thorough milk inspection at present should consist of the following four points, namely:

1. A thorough inspection by a competent veterinarian of the herds of cattle, buildings, water supply, and the general hygienic conditions under which the milk is produced.

2. A bacteriologic and biologic examination which will determine the number of bacteria, also some information regarding the kind and biologic condition produced by certain substances and varieties of bacteria.

3. A practical chemical examination.

4. In cases where a laboratory examination reveals the presence of any pathological condition, there should then be an inspector sent to the dairy to remove the cause and not merely report the laboratory examination with the idea of eventually getting a negative result.

The following is a brief summary of milk examination as reported by the Pennsylvania S. L. S. B.:

At the milk hygiene laboratory of the Pennsylvania S. L. S. B., located at the Veterinary Department of the University of Penn-

sylvania, milk examinations are made in co-operation with the Boards of Health throughout Pennsylvania. When a certain city or town wishes to have a milk inspection, their Board of Health makes an application to the Pennsylvania S. L. S. B., and upon the receipt of their application an agent is sent to said city or town. The agent makes an inspection of the dairies, using the score-card system; in some cases, applies the sediment test, and collects samples for laboratory examination.

A general and what we consider a practical laboratory examination is made as follows:

As a rule about thirty samples are sent at one time from a certain town. The samples are numbered in numerical order, each number representing a certain dairy or dealer in the said town.

Upon arrival at the laboratory, the temperature is taken to determine what care was used in the shipment.

Bacteriological Examination.

A bacteriological examination is then made by mixing the samples and placing 1 c. c. of milk in a sterile bottle containing 299 c. c. of sterile water which has been previously prepared and sterilized. By using water bottles previously prepared we are able to save considerable time and apparatus. Three plates are poured, using sugar-agar, and allowing them to remain at incubator temperature for forty-eight hours before counting.

Alcohol Test.

The alcohol test is applied to each sample. The method of applying the tests consists of placing 5 c. c. of milk and an equal volume of 68% alcohol in a sterile test tube, mix thoroughly, and allow them to stand from ten to twenty minutes. At the expiration of this time the tube is examined to determine whether there is any coagulation of floculi deposited on the side of the tube; if so, it is considered a positive reaction.

The reaction usually depends upon where there is an abnormal amount of albumen present, which usually is associated with an inflammatory exudate. In cases where there is a high

per cent of acidity, the alcohol test will also give a reaction. Also decomposition of milk by other bacteria. This test is easy to apply, and can be performed either in the field or at the laboratory. The test is of great value to detect diseased cows in the milk line, also diseased quarters in the same animal.

Fermentation Test.

The fermentation test is also applied to each sample. The method of applying the test consists in placing 15 or 20 c. c. of milk in a sterile test tube and allowing it to remain until coagulation appears. The character of the curd formed gives information regarding the species or kind of bacteria present in the sample. Example: In case of a smooth, jelly-like curd, it indicates the presence of a large number of lactic acid. This condition is symbolized by "J-1," "J-2," "J-3," according to the amount of jelly curd. "J-1" indicates a perfect curd.

In case the curd is digested or peptonized, and considerable liquid present, the condition indicates the presence of such bacteria as belong to the subtilis staphtylococci group. This condition is symbolized by "P-1," "P-2," "P-3," according to the amount of peptonization or digested curd.

If the curd contains many gas bubbles, it indicates the presence of gas-producing bacteria, such as B. Arogenes and B. Coli. This condition is symbolized by the letters "G-1," "G-2," "G-3," according to the amount of gas present.

This test is easy to perform, and gives considerable information regarding the kind of bacteria present in the samples.

Reductase Test.

This test is applied to each sample. The application of the test consists in placing 40 c. c. of milk in a sterile test tube along with 1 c. c. of a 2½% Sol. of methylene blue, and holding it at a temperature of about 42° C. The tubes are examined frequently to determine the length of time required for the color to disappear. The length of time depends somewhat upon the number of bacteria present. Good milk, containing less than 10,000 bacteria per c. c., will not usually reduce in less than five

to six hours, while milk containing 1,000,000 per c. c. will usually reduce within twenty minutes to one half hour. It is not necessary to perform this test along with a bacterial count, but will often aid in case one wishes to change their dilution for plating before the sample is too old or sour. This test is a rough, practical method of determining the number of bacteria contained in a sample of milk.

Catalase Test.

Catalase is a natural enzyme or ferment contained in milk, but is increased during certain periods of lactation, under certain inflammatory conditions of the udder, and also when certain types or species of bacteria are present. This ferment has the property of liberating oxygen when hydrogen peroxide is added to milk.

The application of the test consists in placing 10 c. c. of milk in a special sterilized bottle along with a tablet containing a certain amount of hydrogen peroxide. A volume of water is attached to the bottle to measure the amount of oxygen given off in a certain period of time, usually two hours.

Good milk should not give off over 3½ to 4 c. c. of oxygen in two hours, while bad milk may give off more than this amount sometimes in a few minutes. The test is closely associated with the alcohol and reduction test, and corresponds in a general way. That is, a positive alcohol reaction and a short reduction time will usually correspond to a large amount of oxygen given off in the catalase test.

Fat Test.

The per cent of fat is determined in all samples by the usual well-known Babcock method.

Specific Gravity.

The specific gravity is determined by the ordinary quevenne lactometer.

Total Solids.

After determining the per cent of fat and specific gravity, the total solids are estimated by the use of a special apparatus known as "Ackerman's Ready Reckoner." This apparatus is

not claimed to equal a chemical analysis in accuracy, but approximates it very closely in any ordinary sample of milk. In cases where a few samples are questionable regarding the adulterations with water, tests are then made with the refractometer, which is considered the most accurate for the detection of adulteration with water.

Preservatives.

All samples are examined for the presence of formalin and boric acid by using the usual chemical methods.

Conclusion.

At the end of forty-eight hours the results of the above-mentioned tests are compared with the results of the field inspector, and tabulated on a special sheet as shown.

By combining practical laboratory methods along with those obtained by the field inspector, we feel that more valuable information can be obtained than is usually gotten by most examinations where they depend entirely on the use of a few laboratory methods.

Professor J. A. Foord, of the Massachusetts Agricultural College, then read a paper on the "Methods and Cost and the Medical Milk Commission:"

THE RELATION OF THE MEDICAL MILK COMMISSIONS TO METHODS AND COST.

Prof. J. A. Foord.

MR. PRESIDENT AND MEMBERS OF THE ASSOCIATION:

I want to assure you of my hearty appreciation of the honor conferred on me in being asked to address this meeting, and further, of my hearty appreciation of the work of the Association and its constituent parts, the Medical Milk Commissions of the country.

We are in agreement, I know, as to the desirability of extending the work and producing more and more of our milk supply of a certified grade; it means life and health to the children

all over our broad land. It is for this reason that the institution that I represent, the Massachusetts Agricultural College, is producing Certified Milk. It is now several years ago that the Farm Committee of our Board of Trustees decided that a demonstration in the production of clean milk was needed in Massachusetts and should be made at the college. Having made this decision, then why not the best milk? So that it was but a step into the certified class. Our trustees made the usual mistake under such circumstances and put too much money into buildings; they over-capitalized the business to start with, but we have a beautiful stable accommodating sixty-four head, and it is our plan that this shall be the limit of our Certified Milk business. It is large enough to give a demonstration for our students of the methods and processes of the business on a commercial scale, and if a sixty-four cow dairy cannot be made successful financially, I doubt if a larger one can. Our Certified Milk business had just been started when I was placed in charge of the Division of Agriculture and the college farm, now nearly six years ago. I have taken time to explain my relation to the business because I want you to understand that my salary at the college does not depend upon the profit of our Certified Milk dairy, and thus it seems to me my position is rather a unique one and I can thus come between the producer and the Commissions. Whatever I may say to-day is in the interest of a wider use and a larger consumption of Certified Milk of good quality and produced at a reasonable profit to the producer.

We compliment ourselves on the increasing use of Certified Milk, but the growth is not what it should be. Only .88 of 1% of the milk supply of the city of Boston is certified, and Dr. Williams tells me that less than 3% is certified in the city of Rochester. Doesn't this show clearly that Certified Milk is often used as a curative agent rather than a food? The variations shown in the shipments of Certified Milk in summer and winter from our own dairy certainly emphasize this point.

Now, we want milk of a certified grade not only for the children of those of us who know(or think we do) about these things, and the children of the wealthy, to whom money is no

object, but we want it for the children of the masses, and not only in sickness, but in health.

Gentlemen, price is the most potent factor in increasing the consumption of any food product. The cost of living is a real problem to most of us. If we are going to largely increase the consumption of Certified Milk, we must reduce the present high cost of production and distribution. This has been done with many other food products without injury to the quality, and I believe Certified Milk need be no exception.

This Association has, after considerable expenditure of time and money, formulated and published "Methods and Standards for the Production and Distribution of Certified Milk." Now, inasmuch as that circular refers to the standards of the product, it is excellent; the personnel of this Association is admirably fitted to decide what the product should be. But what about methods? One of your former members only last evening told us that he could not milk a cow, never had; and I think it was no less an authority than Dr. Park, of the New York Commission, who, in answer to a question, said, "We recommend the methods of our best producers." But, gentlemen, a good deal of Certified Milk in the past has been produced by wealthy men, to whom cost was no consideration, and we have all heard the joke about Tom Lawson, or some other wealthy man with a farm, offering his guest champagne or Certified Milk—"It costs about the same."

As I have just said, Certified Milk must be produced on a commercial basis before it can become of any particular importance as a food product, and the men to put it there, by suggesting methods for reducing the cost of production, are not the medical men, who know nothing about farming, but the intelligent producers with wide experience in the work; and the purpose of this paper is to urge upon this Association the strict adherence to the standards that refer to the product and a broad-minded and liberal interpretation of the rules you have as to methods. In fact, I believe these should be suggestions rather than rules. I urge this in order to promote initiative and improvement all along the line. We have in Massachusetts, and

I think you have in other States, some well-meaning people who are interested in the improvement of the milk supply, and who seem to think that the only essentials are a set of rules and a baseball club to hold over the head of the farmer. These people have not made any progress, and the Milk Commission that adopts this plan—and a few of them unfortunately have in the past—will not get ahead very fast either. To make progress we must have the heartiest co-operation, and at the same time each branch of the work in charge of men of experience and training along that line, who shall be free to "go forward," even if it means a reversal of established practices. The only essential, it seems to me, is a safe, pure milk of a certain and constant quality.

Your own Dr. Coit has said, before the International Congress on Hygiene: "It will be found necessary for Milk Commissions to exercise patience in realizing many of their plans. Educational influences are always slow, and in this matter the installment of new methods must often wait upon increased business to warrant the outlay." And further: "The price of the product is not an insignificant factor in the success of the plan. Expensive requirements may call for the expenditure of large sums by the dairyman."

Suppose we come down to details for a moment; the rules say that the stable floors *shall be* of cement; and you know and I know that, no matter how desirable it is, there are men in this audience that could produce Certified Milk if they never had a cement floor. In other words, *the man* is the most important factor.

In connection with this subject of buildings, may I call your attention to Bulletin 177 of the Maryland Agricultural Experiment Station, "The bacterial content of milk produced in the open stable and in the closed stable?" While not producing Certified Milk, the results of three winters' experiments show that milk of just as low a germ content was produced in an open stable with cows running loose as when they were confined to the stall. It is further shown that this plan makes for economy of construction, economy of labor, cleaner cows, better manure,

a slightly lower food cost per quart of milk, and more comfort for the animals. We have done a little along this line at the Massachusetts Agricultural College, but only with young stock. Last fall we put up a shed about 34x70 feet, with plenty of window space and containing four loose pens, each about 14x29, with dirt floors, and doors wide enough to back in a cart on the south side. The upper half of these doors has not been closed during the past winter, and the stock have done well. From my experience with this shed, and the results of the Maryland experiment in mind, I have no hesitation in saying that I believe it is easily possible to make Certified Milk under such a plan and at the same time develop a healthier and more vigorous herd of cows that would, therefore, be more resistent to that most difficult of all cost factors, tuberculosis.

Take the subject of ventilation,—we have yet much to learn on this subject, but I am inclined to think that cubic feet of air supplied is more important than "air space." The Geneva Station, in this State, has apparently shown by careful experiment that clipping the udder and flanks of the cow has little influence on the germ content of the milk. This station also seems to show that other of our favorite methods are at least of equal question. Some Commissions have urged that feed should not be kept over the cattle, but I fail to see why, with a tight ceiling and the fodder not thrown directly into the stable, there is any legitimate reason for their objection. And so we might go on indefinitely.

Let me urge once again, in closing, the formulation of the standard for the product by the Commission, freedom for initiative in method for the producer, and a closer co-operation between both. This, I believe, should lead us to joint meetings of the Association of Medical Milk Commissions and the Association of Certified Milk Producers not once in five years, but every year.

These papers were discussed together, Professors Raymond A. Pearson, Ravenel, and others participating. At the

conclusion of the scientific program, the Association adjourned to meet in San Francisco in 1915.

At the close of the meeting the members and delegates inspected the beautiful Elm Place Farm. As guests of the Avon Board of Trade they were then taken in automobiles for a twenty-five mile automobile ride up the beautiful Genesee Valley. The party returned in time for a subscription dinner, which was held in the ancient post-road tavern now known as the Avon Inn, at the conclusion of which the party returned to Rochester, and the Convention was at an end.

Constitution and By-Laws of the American Association of Medical Milk Commissions.

CONSTITUTION.

Article I. Name of the Association.

The name of this organization shall be "The American Association of Medical Milk Commissions."

Article II. Purposes of the Organization.

The purpose of this Association shall be: (1) to federate and to bring into one compact association the Medical Milk Commissions of the United States; (2) to exchange views, and to adopt uniform methods of procedure in the work of the Medical Milk Commissions; (3) to fix chemical and bacteriologic standards; (4) to determine the scope of medical and veterinary inspections, and (5) to foster and encourage the establishment of Medical Milk Commissions.

Article III. Membership.

SECTION 1. Any Medical Milk Commission, on nomination of Council, may become a member of the Association on two-thirds vote of the registered members present at any regular meeting, and on payment of the dues for the current year as prescribed by the Council.

SEC. 2. Any individual especially interested in dairy hygiene, not a member of a component Medical Milk Commission, on recommendation of the Council, may become an individual member by a majority vote of the registered members at any meeting, and by paying such dues as the Council may prescribe. Members of component Medical Milk Commissions in good standing may become individual members of the Association by paying such dues as the Council may prescribe.

Article IV. Composition of the Conferences of this Association.

SECTION 1. The Conferences shall include delegates, individual members, and guests.

Article V. Sessions and Meetings.

SECTION 1. The Association shall hold an annual session at a time and place to be fixed by the Council.

Article VI. Officers.

SECTION 1. The officers of this Association shall be a President, a Secretary, an Assistant Secretary, and a Treasurer.

SEC. 2. The officers shall be elected for a term of one year, and shall serve until their successors are elected and installed.

SEC. 3. The Council shall be composed of the officers of the Association and five additional members. Each year one of the members of the Association shall be elected to Council for a term of five years.

At each annual meeting the member of the Council who has served the longest as a member shall be Chairman.

SEC. 4. *The officers of the Association and members of the Council shall be elected by vote of the Association (delegates and individual members).*

Article VII. Duties of Officers.

SECTION 1. *The President.*—It shall be the duty of the President to preside at all meetings of the Association.

SEC. 2. *The Secretary*—The Secretary shall conduct all correspondence of the Association; shall arrange the details of the annual meetings, under the direction of the Council; shall arrange and distribute programs of the annual meeting at least three weeks in advance of the meeting, and shall perform such other duties as are usually assigned to him.

SEC. 3. *The Treasurer.*—The Treasurer shall collect the annual dues from members of the Association. He shall keep his account in bank in the name of the Association; and shall pay

out all moneys by check upon receipt of a properly executed order signed by the President or acting President. He shall make an annual report to the Association of his receipts and disbursements, which shall be audited by a committee appointed by the President.

SEC. 4. *Duties of the Council.*—The Chairman of the Council shall preside at the regular annual conferences of the Association in the absence of the President, or upon the request of the President that he do so.

It shall be the duty of the Council to take charge of the business of the Association in the interim of its meetings; to make nominations for officers; to fill vacancies that occur between meetings; to publish the report of the proceedings; to fix the annual dues; to arrange for the program and order of business; to nominate new Commissions and individuals for membership, and to select and invite guests. The Secretary of the Association shall be the Secretary of the Council.

The Council shall have a right to exclude from the transactions of the Association any paper which it considers unsuitable for publication.

Article VIII. Amendments.

SECTION 1. Amendments to the Constitution and By-laws may be made by two-thirds vote of the registered delegates and individual members at any annual session, *provided such amendments* shall have been presented in an open meeting at the annual session and shall have been sent officially to each component Commission and each individual member at *least two months* before the next succeeding session, at which final action shall be taken.

BY-LAWS.

Chapter I. Membership.

SECTION 1. *Delegates.*—Each component Medical Milk Commission shall be entitled to elect *three delegates* to the annual session. Delegates shall be entitled to all the privileges of the Association.

SEC. 2. *Individual Members.*—Individual members shall be entitled to all the privileges of the Association.

SEC. 3. *Guests.*—Any distinguished physician, educator in medical sanitation, or dairy hygienist may become a guest during any annual session, upon invitation of the Council, and shall be accorded the privilege of participating in all scientific work of that session.

Any component Commission may nominate a distinguished physician, educator in medical sanitation, or dairy hygienist to the Council to receive an invitation from that body to be a guest of the Association at its annual conference. Invitations to such nominees shall be extended by said Secretary with approval of the Council.

SEC. 4. Each delegate and individual member in attendance at each annual session shall enter his name on a registration card to be provided by the Secretary, and in the case of a delegate, he shall indicate thereon the component Commission he represents. When his membership has been verified, he shall receive a badge as an indication of his registration.

No delegate nor individual member shall take part in any of the discussions of the annual sessions until the dues of the individual member, or, in the case of the delegate, the dues of the Commission which he represents, shall have been paid and he shall have complied with the other provisions of this section.

Chapter II. Sessions.

SECTION 1. The Association shall hold an annual session, meeting at a point selected by the Council.

SEC. 2. Meetings of the Council shall be held the day immediately preceding the annual session, at a time and place to be selected by the Chairman. The Chairman of the Council shall call special meetings of the Council when petitioned to do so by five of its members.

Chapter III. General Meetings.

SECTION 1. The General Meetings shall include all registered delegates, individual members, and guests. Each general meet-

ing shall be presided over by the President, or in his absence or disability, or at his request, by the Chairman of the Council.

SEC. 2. Except by special vote, the order of business, papers and discussions, reports of committees, etc., as set forth in the program shall be followed until completed.

SEC. 3. No address or paper presented to the Association shall occupy more than fifteen minutes in its delivery, and no member shall speak longer than *five minutes* in discussion, and *not more than once* on any subject, except by two-thirds vote of the members present.

SEC. 4. All papers before the Association shall be its property and may be published in the annual volume of its transactions.

Chapter IV. Delegates.

SECTION 1. Election of the officers and members of Council shall be held on the first afternoon of each annual session. In accordance with the provisions of the Constitution, nominations for these offices must be submitted by the Council, but additional nominations may be made from the floor of the meeting.

All elections shall be by secret ballot, and the majority of the votes cast shall be necessary to elect.

SEC. 2. A majority of the registered delegates and individual members shall constitute a quorum.

Chapter V. Committees.

SECTION 1. Standing Committees of the Association shall be as follows:

Medical Examination of Employees.
Chemical Standards.
Bacteriological Standards.
Veterinary Inspections.

Chapter VI. Annual Dues.

SECTION 1. The annual dues for Commissions and individual members shall be fixed by the Council from year to year in accordance with the needs of the Treasury.

List of Medical Milk Commissions in the United States and Canada.[1]

ALABAMA.

Milk Commission of the Jefferson Co. Medical Society, Birmingham.
Chairman, Thos. D. Parke, M.D., First National Bank Building.
Secretary, J. Ross Snyder, M.D., Woodward Building.

Milk Commission of the Mobile Co. Medical Society, Mobile.
Secretary, Dan'l T. McCall, M.D., Van Antwerp Building.

CALIFORNIA.

Milk Commission of the Alameda Co. Medical Association.
Chairman, T. C. McCleave, M.D., Federal Realty Building, Oakland.
Secretary, J. K. Hamilton, M.D., Bay Station, Alameda.

Milk Commission of Los Angeles Co. Medical Society.
Chairman, Fitch C. E. Mattison, M.D., Pasadena.
Secretary, P. V. K. Johnson, M.D., Los Angeles.

Milk Commission of the San Francisco Co. Medical Society.
Chairman, Adelaide Brown, M.D., 240 Stockston Street, San Francisco.
Secretary, E. C. Fleischner, M.D., 350 Post Street, San Francisco.

COLORADO.

Milk Commission of the El Paso Co. Medical Society, Colorado Springs.
Chairman, C. F. Gardiner, M.D., Cascade Avenue.[2]

CONNECTICUT.

Milk Commission of the Bridgeport Medical Association, Bridgeport.
Chairman, Charles N. Haskell, M.D., 467 State Street.

Milk Commission of the Greenwich Medical Society, Greenwich.
Chairman, A. W. Klein, M.D.
Secretary, Edward Parker, M.D.

Milk Commission of the Hartford Co. Medical Society, Hartford.
Chairman, Walter S. Murphy, M.D., 75 Pratt Street.

Milk Commission of the Stamford Medical Association, Stamford.
Chairman, Donald R. MacLean, M.D., 87 South Street.
Secretary, R. W. Crane, M.D., 107 South Street.

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[1] Although the Secretary endeavors to keep a complete list of all Medical Milk Commissions in the United States and Canada, there may be Commissions of which he has no knowledge.

[2] Not active.

ILLINOIS.

Milk Commission of the Chicago Medical Society, Chicago.
Chairman, Robert A. Black, M.D., Hotel Del Prado.
Secretary, J. W. Van Derslice, M.D., 155 North Ridgeland Avenue, Oak Park, Ill.

Milk Commission of Galesburg, Ill.
Chairman, Ben D. Baird, M.D., Main Street.

Milk Commission of the Sangamon Co. Medical Society, Springfield.
Chairman, S. E. Munson, M.D., Leland Office Building.
Secretary, T. J. Knudson, M.D.

KENTUCKY.

Milk Commission of Jefferson Co. Medical Society, Louisville.
Chairman, Cuthbert Thompson, M.D., Weissinger-Gaulbert Building.
Secretary, Ben Carlos Frazier, M.D., 705 South Third Street.

Milk Commission of the Fayette Co. Medical Society, Lexington.
Chairman, E. B. Bradley, M.D.

LOUISIANA.

Milk Commission of the New Orleans Pure Milk Society, New Orleans.
President, L. R. De Buys, M.D., Maison Blanche Building.

MASSACHUSETTS.

Medical Milk Commission of Boston, Inc., Boston.
Chairman, Richard M. Smith, M.D., 329 Beacon Street.
Secretary, Richard S. Eustis, M.D., 329 Beacon Street.

Medical Milk Commission of Cambridge, Cambridge.
Chairman, Frederick Taylor, M.D., 1735 Massachusetts Avenue.
Secretary, A. P. Norris, M.D., 760 Massachusetts Avenue.

Medical Milk Commission of the City of Malden.
President, A. J. Stevens, M.D., 593 Main Street.
Secretary, E. W. Barron, M.D., 300 Pleasant Street.

Medical Milk Commission of New Bedford.
Chairman, Horatio C. Allen, M.D., 11 Eighth Street.
Secretary, Wm. A. Nield, M.D., 286 Pleasant Street.

Medical Milk Commission of West Tisbury, Inc.
Secretary, Edward P. Worth, M.D., Edgartown, Island of Martha's Vineyard.

Medical Milk Commission of Worcester, Mass.
Chairman, Walter L. Jennings, M.D., 18 Boynton Street.
Secretary, R. J. Ward, M.D., 397 Pleasant Street.

MICHIGAN.

Milk Commisison of Calhoun County Medical Society, Battle Creek.[2]
Chairman, Chas. E. Stewart, M.D.
Secretary, W. H. Haughey, M.D.

Milk Commission of Wayne Co., Detroit.[1]
Chairman, G. L. Kiefer, M.D., Kresge Building.
Secretary, Wm. H. Price, M.D., Board of Health.

Milk Commission of Flint.
Secretary, M. W. Clift, M.D.

Milk Commission of the Kent Co. Medical Society, Grand Rapids.
President, M. C. Sinclair, M.D., Widdicomb Building.
Secretary, C. C. Slemons, M.D., City Hall.

Milk Commission of the City of Lansing.[2]
Chairman, Samuel Osborn, M.D.
Secretary, M. L. Holm, M.D.

MINNESOTA.

Milk Commission of the Hennepin Co. Medical Society, Minneapolis.
Chairman, J. P. Sedgwick, M.D., New Syndicate Building.
Secretary, Geo. D. Haggard, M.D., 2400 Chicago Avenue.

MISSOURI.

Milk Commission of the Jackson Co. Medical Society, Kansas City.
Chairman, George C. Mosher, M.D., Bryant Building.
Secretary, Edwin Henry Schorer, M.D., 100 Rialto Building.

St. Louis Pure Milk Commission.
President, Geo. M. Tuttle, M.D., 4917 Maryland Avenue.
Secretary, H. E. Mortland, Esq., 1726 North Thirteenth Street.

NEW JERSEY.

Medical Milk Commission of Union Co., No. 2.
President, Edgar B. Grier, M.D., Elizabeth, N. J.
Secretary, Arthur Stern, M.D., Elizabeth, N. J.

Medical Milk Commission of Union Co., No. 3.
President, Eliot Gorton, M.D., Summit, N. J.

Medical Milk Commission of Essex Co.
Chairman, Henry L. Coit, M.D., 277 Mt. Prospect Avenue, Newark.
Secretary, Floy McEdwn, M.D., 299 Belleville Avenue, Newark.

Medical Milk Commission of Hudson Co.
Chairman, J. A. Exton, M.D., Arlington.
Secretary, S. A. Cosgrove, M.D., Jersey City.

[1]Appointed by Board of Health.
[2]Appointed by State Board of Health.

Milk Commission of Morris Co. Medical Society, Morris Co.
Chairman, F. H. Glazebrook, M.D., Morristown.
Secretary, T. W. Bebout, M.D., Stirling.

Milk Commission of the Passaic Co. Medical Society, Paterson.
Chairman, Francis H. Todd, M.D., 218 Broadway.
Secretary, G. Edward Tuers, M.D., 12 Church Street.

NEW YORK.

Milk Committee of the Medical Society of Albany Co., Albany.
Chairman, James P. Boyd, M.D., 152 Washington Avenue.

Milk Commission of the Medical Society of Broome Co., Binghamton.
President, Le Roy D. Farnham, M.D., 42 Main Street.
Secretary, C. W. Greene, M.D., 16 Jay Street.

Milk Commission of the Medical Society of the County of Kings, Brooklyn.
Chairman, Alfred Bell, M.D., 559 Decatur Street.
Secretary, Roger Durham, M.D., 322 Park Place.

Milk Commission of the Medical Society of Erie Co., Buffalo, N. Y.
Chairman, Nelson G. Russell, M.D., 469 Franklin Street.

Milk Commission of the Chautauqua Co. Medical Society, Dunkirk.
Chairman, M. S. Coxe, M.D.
Secretary, C. Hallenbeck, M.D.

Milk Commission of the Elmira Academy of Medicine, Elmira.
Chairman, (Vacant.)
Secretary, Ross G. Lopp, M.D., 359 Main Street.

Milk Commission of the Warren Co. Medical Society, Glens Falls.
Chairman, David Hall, M.D.
Secretary, Morris Maslon, M.D.

Milk Commission of Westchester Co. Medical Society, Mount Vernon.
Chairman, R. C. Eddy, M.D., New Rochelle, N. Y.
Secretary, W. D. Robertson, M.D., Mount Vernon, N.Y.

Milk Commission of the Medical Society of the County of New York, New York City.
Chairman, E. K. Dunham, M.D., 338 East 26th Street.
Secretary, Rowland G. Freeman, M.D., 211 West 57th Street.

Milk Commission of the Medical Society of the County of Dutchess, Poughkeepsie.
Chairman, A. L. Peckham, M.D., 31 Cannon Street.
Secretary, C. Knight Deyo, M.D., 255 Mill Street.

Milk Commission of the Medical Society of Monroe Co., Rochester.
Chairman, R. M. Moore, M.D., 74 South Fitzhugh Street.
Secretary, John R. Williams, M.D., 388 Monroe Avenue.

Milk Commission of Essex Co. Medical Society, Saranac Lake.
Chairman, M. E. Proctor, M.D., Lake Placid.

Milk Commission of Schenectady Co. Medical Society, Schenectady.
Chairman and Secretary, Frank Vander Bogert, M.D., 111 Union Street.

Milk Commission of the Onondaga Medical Society, Syracuse.
Chairman, A. Clifford Mercer, M.D., 324 Montgomery Street.
Secretary, Joseph C. Palmer, M.D., 600 East Genesee Street.

Milk Commission of the Orange Co. Medical Society, Tuxedo.
Chairman, E. C. Rushmore, M.D.

Milk Commission of the Oneida Co. Medical Society, Utica.
Chairman, Conway A. Frost, M.D., 15 Plant Street.
Secretary, T. W. Clarke, M.D., 240 Genesee Street.

NORTH CAROLINA.

Milk Commission of the Buncombe Co. Medical Society, Asheville.
Chairman, Carl V. Reynolds, M.D., 11 Church Street.
Secretary, L. B. McBrayer, M.D., City Hall.

OHIO.

Milk Commission of the Academy of Medicine, Cleveland.
Chairman, Samuel Mather, Esq., Western Reserve Building.
Secretary, J. J. Thomas, M.D., 1110 Euclid Avenue.

Milk Commission of the Academy of Medicine, Cincinnati.
Chairman, Alfred Friedlander, M.D., 4 West Seventh Street.
Secretary, Otto P. Geier, M.D., Ortiz Building.

Milk Commission of the Academy of Medicine, Columbus.
Chairman, Ernest Scott, M.D., Starling-Ohio Medical College.
Secretary, George C. Schaeffer, M.D., 112 East Broad Street.

Milk Commission of the Montgomery Co. Medical Society, Dayton.
Chairman, C. W. King, M.D.
Secretary, R. C. Pennywitt, M.D.

Milk Commission of the Academy of Medicine, Toledo.
Chairman, C. F. Tenney, M.D.
Secretary, H. J. Morgan, M.D., 214 Colton Building.

Milk Commission of the Mahoning Co. Medical Society, Youngstown.
Chairman, C. R. Clark, M.D., Bryson Street.
Secretary, Sidney M. McCurdy, M.D., 243 Norwood Avenue.

OREGON.

Certified Milk Commission of the City of Portland.[1]
Chairman, K. A. J. Mackenzie, M.D., Corbett Building.
Secretary, D. W. Mack, D.V.S., 308 City Hall.

PENNSYLVANIA.

Milk Commission of the Erie Co. Medical Society, Erie.
Chairman, Fred E. Ross, M.D., 154 West Eighth Street.
Secretary, Anna M. Schrade, M.D., 716 Sassafras Street.

Milk Commission of the Harrisburg Academy of Medicine, Harrisburg.
Chairman, David S. Funk, M.D., 300 North Second Street.
Secretary, Henry R. Douglas, M.D., 1800 Market Street.

Lancaster City and County Medical Society Milk Commission, Lancaster.
Chairman, Charles P. Stahr, M.D., City Hall.

Milk Commission of the Philadelphia Pediatric Society, Philadelphia.
Chairman, Alfred Hand, Jr., M.D., 1724 Pine Street.
Secretary, Maurice Ostheimer, M.D., 2202 De Lancey Place.

Milk Commission of the Allegheny Co. Medical Society, Pittsburgh.
Chairman, W. T. Burleigh, M.D., 825 North Negley Avenue.
Secretary, H. T. Price, M.D., 601 North Street, Clark Street.

TENNESSEE.

Milk Commission of the Memphis and Shelby County Medical Societies, Memphis.
Chairman, (Vacant.)
Secretary, E. C. Mitchell, M.D., Randolph Building.

Milk Commission of the Academy of Medicine, Nashville.
Chairman, O. H. Wilson, M.D., 1620 West End Avenue.
Secretary, S. M. Bloomstein, M.D., 1908 Broad Street.

TEXAS.

Milk Commission of the El Paso Co. Medical Society, El Paso.
Chairman, J. A. Rawlings, M.D.
Secretary, Branch Craige, M.D., 318 Mills Building.

Milk Commission of the Bexar Co. Medical Society, San Antonio.
Chairman, Greer H. Baker, M.D., Moore Building.

[1] Appointed by the Mayor.